The American Quarterly of Roentgenology

Editor, P. M. Hickey, M. D., Detroit
Associate Editor, F. C. Zapffe, M. D., Chicago

Vol. IV AUGUST, 1912 No. 1

ROENTGENOGRAPHIC DIAGNOSIS ON URETERAL KINKS CAUSING INTERMITTENT HYDRONEPHROSIS.

BY G. H. STOVER, M. D., DENVER, COLORADO.

While the Roentgenographic examination of the renal pelvis and ureter following the injection of opaque fluids such as collargol, etc., is not new, it is believed that a suggestion of Dr. O. S. Fowler, of Denver, Colo., regarding an addition to the technique of these examinations, which technique has since been made use of by the writer and Dr. Fowler in the examination of several cases, has practically developed a new method of examination and diagnosis in a very troublesome class of kidney cases.

Hydronephrosis has heretofore been recognized only in rather an advanced age, when the dilatation of the renal pelvis is considerable; the Mayos, for instance, consider that the renal pelvis must be able to contain 50CC. of fluid before they make a diagnosis of operable hydronephrosis; at this time the function of the kidney is markedly impaired and its structure may have received serious damage.

Many of the classically hydronephrotic cases are found at operation to accompany a movable kidney, in which there is a dilatation of the renal pelvis and in which there is also a dilatation of the ureter above the location of an aberrant artery or vein, or a band of adhesion; these patients were relieved after a fixation of the kidney and removal of the obstructing structure.

We have found, and have demonstrated by catheter tests,

L 615.051
A518

247295
142768

Roentgenograms and surgical operation that there is easily recognizable a much earlier stage of this condition, to be discovered before dilatation of the renal pelvis has taken place.

A certain number of patients complain of pain in one or both kidneys; a pain somewhat like that of the classical hydronephrosis, but not relieved by the sudden passage of a quantity of urine and a disappearance of the tumor, and without the microscopic urinary findings of fully developed hydronephrosis; a pain suggestive, but not typical of renal calculus colic, and in which Roentgenographic examination for stone is negative. The symptom complex in this class of cases has usually been rather vague in its diagnostic indications, and there have undoubtedly been many instances in which a faulty diagnosis has led to operation for conditions which were not present, the trouble being laid to an appendix, a tube, an ovary, or a gall bladder.

In the class of cases under consideration it was found by Dr. Fowler that the injection of a comparatively small amount of solution (averaging only 14 CC.) into the pelvis of the kidney, produced a pain exactly similar to the pain from which the patient suffered, an injection of the unaffected kidney produced a pain which the patient had never felt there before, but identical with that which had been felt on the other side.

We had already examined hydronephrotic cases after collargol injections, and in the course of several conferences on the subject of the Roentgenographic examination of the various viscera in which mention was made of the fact that I, as a routine, make Roentgenographic examinations of the stomach and intestines with the patient in the erect posture, Dr. Fowler suggested that in examining these cases of "intermittent hydronephrosis" the collargol be injected first with the patient reclining and a plate made, then the patient placed in the erect posture and a second plate made; while the patient is in the erect posture he is instructed to make various movements of the trunk, such as would be calculated to dislodge a really movable kidney, and at the same time the ureteral catheter is being withdrawn while a further amount of solution is being injected through it, thus showing Roentenographically the changed position of the kidney and demonstrating the appearance of the ureteral kink; this procedure, as far as we can ascertain, has not been made use of prior to our work.

Mrs. C. R. G. Plate I, Recumbent; plate 2, erect. Operation revealed kink in left ureter to be due to a looping of the

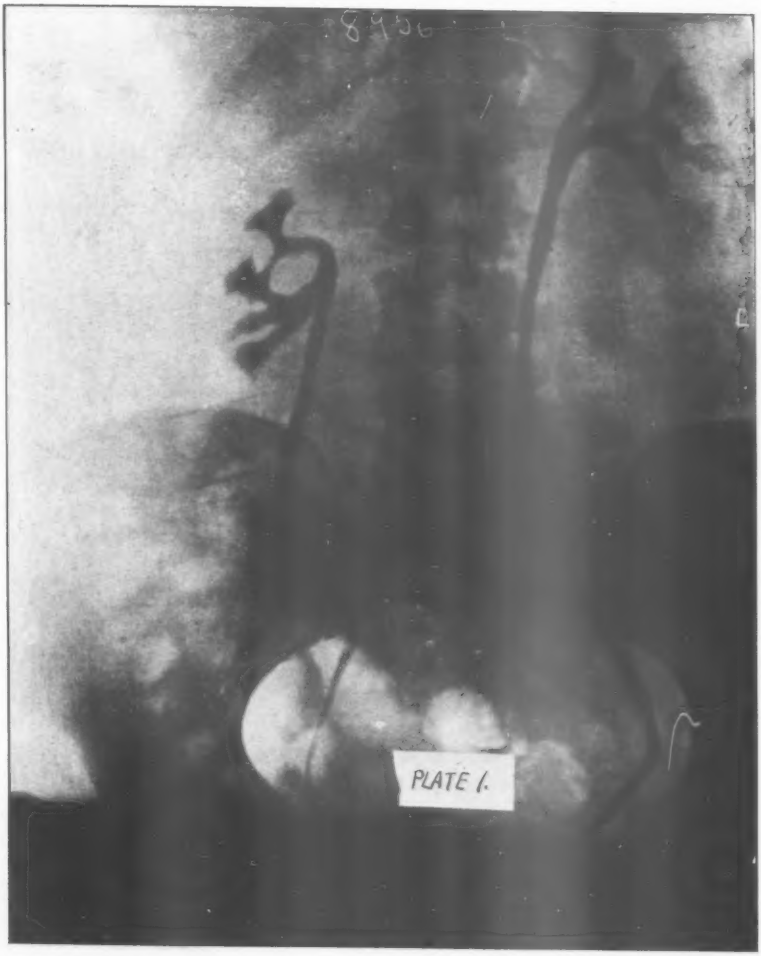
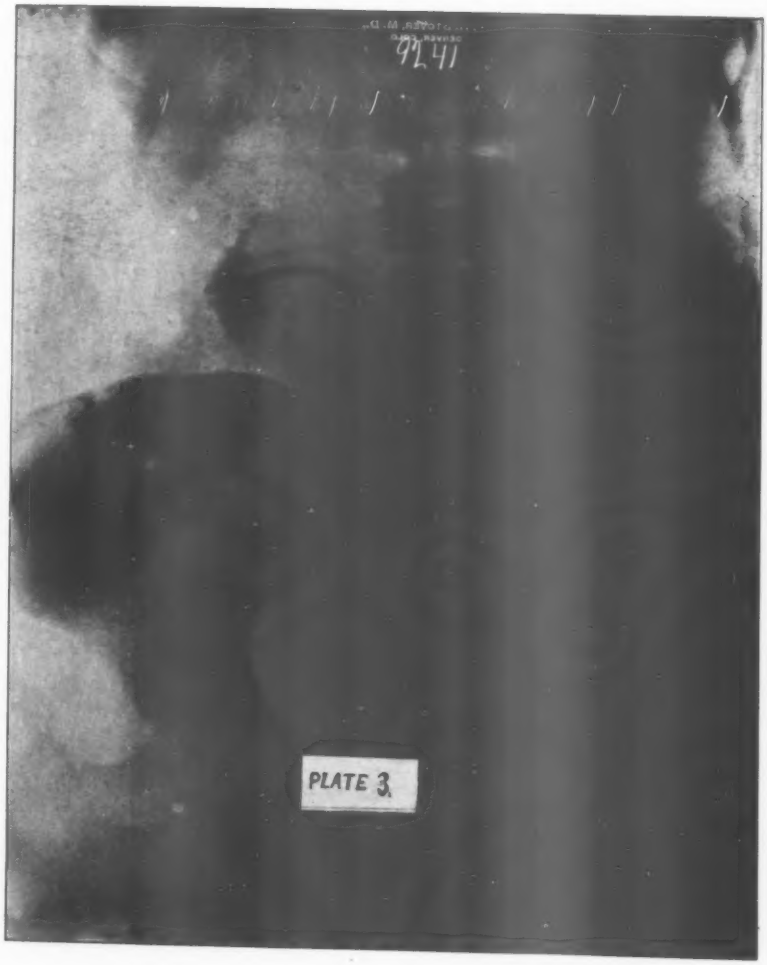
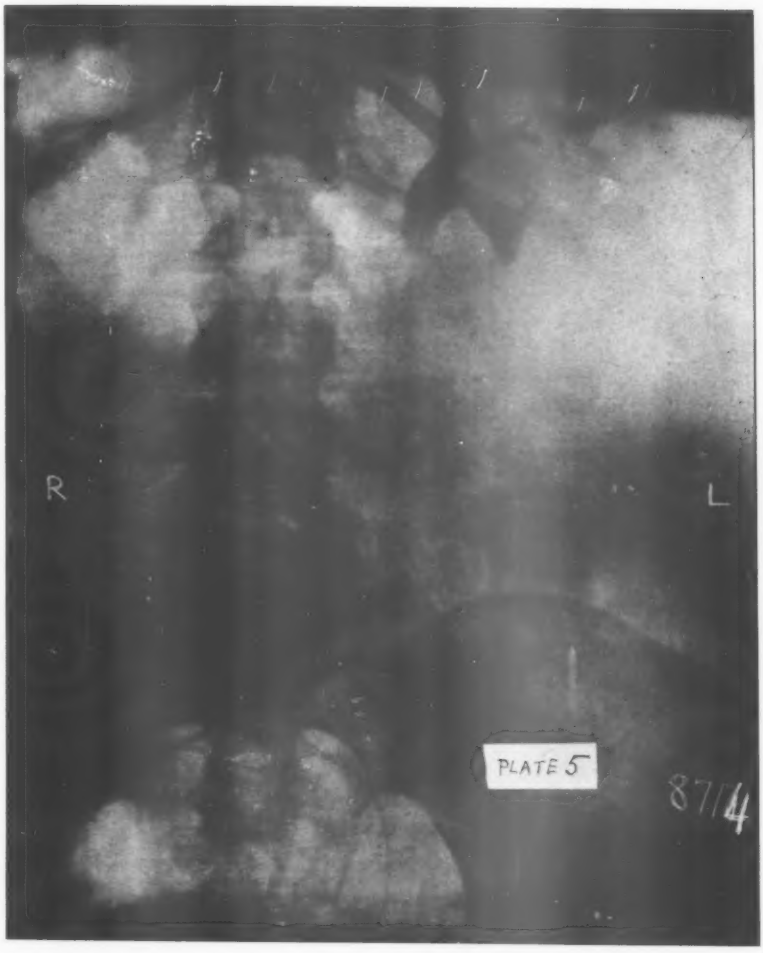
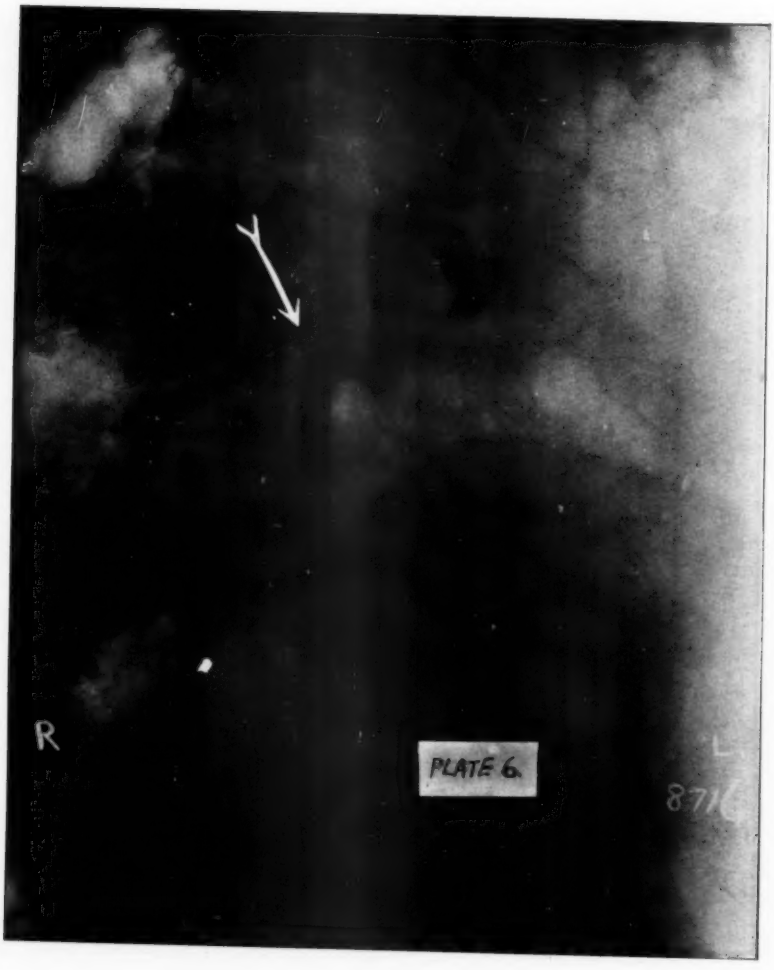


PLATE I.


92.41
PLATE 3

9242
PLATE 4


R
L
PLATE 5
8714


R
PLATE 6.
L
8716

R.
L.
PLATE 7.

THE
JOHN CRERAR
LIBRARY

ureter of the descended kidney over a connective tissue band. This band divided and the kidney elevated and fixed. Complete relief. This patient had a bifurcation of the renal pelvis.

Mrs. R. W. Plate 3, recumbent; plate 4, erect. Right kidney has a double ureter in the upper six inches. Kink due to twisting of the two tubes when the kidney descended. As the left kidney was also movable a double nephropexy was done. Complete relief.

Mrs. S. J. W. Plate 5, recumbent; plate 6, erect. Kink due to aberrant vein over which ureter loops when kidney descends. Vein divided and kidney elevated and fixed. Complete relief.

Mrs. J. F. M. Plate 7, patient erect. Kink due to looping of ureter over aberrant artery, which was divided and kidney elevated and fixed, with complete relief.

Operation has always so far shown the kink to be due to an aberrant vessel over which the ureter loops when the kidney descends.

I take pleasure in presenting illustrations showing our Roentgenographic findings in some of the cases we have examined in this way.

DISCUSSION.

DR. J. H. SELBEY, ROCHESTER, MINN.: I want to congratulate Dr. Stover on his work. Our experience with this work has been the difficulty of making these examinations. It is hard to control the patient unless you also do a cystoscopic examination. Their feet slip and they get very uncomfortable and when the time for the examination arrives, it is difficult to get them into the proper position. I am satisfied that there are quite a few of these cases which could be recognized if we carried out the technic which Dr. Stover has given us.

DR. PERCY BROWN, BOSTON: I had a case which clinically was pronounced as a nephroptosis but the Dietl's crises were out of proportion to the degree of ptosis. I made a Roentgenogram and found a kink in the ureter. A ptosis was present but was not startling.

DR. STOVER, CLOSING THE DISCUSSION: Our hospitals in Denver are not provided with proper Roentgen apparatus and all this work is done in my own office. Dr. Fowler makes the cystoscopic examination first. Then the patient is put on her back on an Allison table with the feet in the stirrups. Dr. Fowler makes the colloargol injection, I slip the plate under the patient and make the exposure. Then I get another plate. The patient assumes the erect posture, the doctor withdraws the catheter and I make another picture. The patient leaves the office in from thirty to sixty minutes in excellent condition. In that way we have been able to do this work satisfactorily.

THE CONTROL OF FRACTURE WORK BY THE ROENTGEN RAY.

BY ROLAND HAMMOND, M. D., PROVIDENCE, R. I.
Assistant Orthopedic Surgeon to Rhode Island Hospital and St. Joseph's Hospital.

It was only a few years ago that a major part of the Roentgenologist's practice consisted in making plates of fractured bones, and even today, with the marked advance of Roentgenology into the special branches of medicine, I imagine much of the routine work of this specialty consists in determining if a bone has been broken, and if so, whether or not the fragments are in proper alignment.

Up to the time of Roentgen's discovery, the treatment of fractures had made but little progress for many years, and time-honored methods, hoary with age, were used. The practitioner in blissful ignorance of the actual relations of fragments, made an apparently good reduction of his fracture, only to be confronted in many cases at the end of his treatment with a stiffened painful joint, or a deformity which stared the patients and his friends in the face, to the lasting opprobrium of the medical attendant. If the reduction has been anatomically perfect, the chances are strongly in favor of a good clinical result. Of course, poor results are occasionally obtained with the best treatment, but they are becoming less common as better methods of diagnosis and treatment are introduced.

The Roentgen ray has changed much of this. We can now determine accurately just what bones are broken and where; if the reduction has been properly made, and oftentimes if a splinter of bone or bit of soft tissue between the fragments prevents a perfect reduction. All this is done without causing the patient the slightest pain. A large proportion of the medical profession recognize these facts, the intelligent part of the laity are informed on the subject, and the courts are becoming convinced of the value of the Roentgen procedure. The time is near at hand when no fracture or joint injury will be considered to have been properly treated if a Reontgen examination has not been made. All this is well known to a body of

men engaged in this special work, but it is in connection with the value of the Roentgen ray in some of the special points of diagnosis and treatment to which I wish to call your attention. It is a well recognized fact that a Roentgen plate should be taken after an attempt at reduction has been made, to see if the desired result has been obtained. Of almost equal importance is a plate beforehand to know accurately with what condition we have to deal—a fact not appreciated by the profession at large. With the knowledge thus obtained, the reduction can often be easily made, and with but slight trauma to the parts. We see just what mechanical force or leverage is necessary, and how to apply it to the best advantage to accomplish the reduction, and without injuring neighboring structures. It is surprising to see the slight force necessary in many cases to reduce a Colles' fracture when we know the exact relation of the fragments beforehand.

In the routine treatment of fractures, I take plates in two planes, and while they are being developed, fit splints to the limb, prepare dressings, and have everything in readiness. Ether is then administered, and reduction is attempted with the plate at hand for reference. If the reduction seems to have been accomplished, the splints are applied temporarily, and another plate taken and developed with the patient still under ether. If the plate shows that the reduction has been satisfactorily accomplished, the splints are more carefully applied and the patient allowed to recover from the anesthetic. If the reduction is not perfect, another attempt is made, and another plate taken and developed, and so on, until the reduction is accomplished, or it is proved that the fracture is irreducible. This procedure occupies from a half hour to an hour at most, and is more satisfactory and much safer than frequent fluoroscopic examinations. The finer relations of the fragments are often missed when the fluoroscope is used, and besides with the plate we have an indisputable record of success or failure. The only drawback is the time consumed, but with well-timed exposures, rapid plates and strong developers the time is shortened, though at the expense of a beautiful negative. One can oftentimes determine if the fracture has been reduced while the plate is developing, but I have found it safer to wait until the plate is in the fixing bath, before making an absolute judgment.

There is a fairly numerous class of cases in which the fragments can not be held in position by the usual splints, and two

courses are open to the surgeon: (1) He can operate and replace the fragments, holding them in position by animal suture, wire or bone plates, or (2) they can be held in place by some external device, usually by extension and counter-extension. In many cases it is absolutely necessary to operate and restore the fragments to their proper position. If the fragments lock together well, no suture or plate is necessary. Oftentimes they can be held by animal suture, which is readily absorbed, and forms an ideal suture material if one must be used. Rarely is it necessary to use bone plates. Mr. Arbuthnot Lane has given a great impetus to bone plating by his remarkable success in these cases. Many cases are plated, however, which I believe could be as well treated by extension and counter-extension, and with greater safety to the patient, if the same thought and energy were used as is employed in operative procedures. We must consider the poor resistance of bones and joints to infection, and the tendency of the wire or plate to act as a foreign body and be extruded before we expose our patients to the risk of suppuration or joint stiffening, or leave a foreign body in the tissues. Most patients prefer not to be operated upon, if as good results can be obtained without taking that risk. These results can be obtained in a large number of cases if the patient will go to bed for two weeks—not much longer than the average operative case is confined.

I have recently treated several cases of transverse fracture of the lower end of the humerus, which could not be held in place by the usual ambulatory splints, or at any angle of flexion or extension of the arm. These were all held by means of extension and counter-extension, and good results obtained. They may serve as examples of this method of treatment in other parts of the body. It is based on the work of Bardenheuer and Graessner who have described their method fully in "Die Technik der Extensionsverbände." The details of this treatment have been further elaborated by my associate, Dr. Frank E. Peckham, to whom I am indebted for much assistance. The patient is put to bed on a Bradford frame with the upper arm in abduction at a right angle to the body, the forearm being held vertically by weight and pulley over the bed. The upper arm is strapped down to a board running beneath the Bradford frame, so that the arm can not be pulled up by the weight on the forearm. Traction is exerted on the arm by a band passing around the forearm just below the elbow, which is attached to a weight passing over the side of the bed. A strap around the

chest and axilla with weight passing over the opposite side of the bed gives the counter-extension. When the apparatus has been adjusted for a day to allow for the effect of constant traction on the fragments, the patient is taken to the Roentgen laboratory in bed and plates made without disturbing the apparatus. In many cases it will be found that the constant pull has reduced the fragment, or ether may have to be given to place the fragment in proper position, after which it is held by the apparatus. In one case too much weight was used, and the fragment was drawn away from the shaft. Removing a couple of pounds' weight allowed the fragment to slip back into its proper relation. Here the Roentgen ray is an infallible guide to the proper adjustment of the fragments, which can thus be made with precision.

Since callus formation does not begin until about the end of the second week, and union is usually firm before the end of four weeks, it is not necessary to put the patient to bed until nearly two weeks after the date of the fracture. Union will ordinarily be firm enough for the patient to be up and free from apparatus by the end of three and a half weeks. Thus we have attained all that could have been accomplished by an open operation, and with none of its attendant risks.

Two cases will illustrate the value of this method:

Case 1—Girl, aged four. Transverse fracture of lower end of humerus one inch above epiphysis. Seen on fifth day after injury, when fracture was reduced under ether, and arm put in acute flexion. Plate showed fragment in position. On seventeenth day plate showed that fragment had slipped out of position. Under ether on the next day it was again put in place as proved by a Roentgen plate. On the twenty-second day a plate showed that the fragment had again slipped. Put to bed the same day with extension and counter-extension. Plate on the twenty-fourth day showed the fragment held in position by the apparatus. Allowed up on the thirty-fourth day with the fragment still in position as proved by the Roentgen plate. The elbow was baked in the hot air oven, and passive movements begun. A month later there was a perfect anatomical and functional result.

Case 2—Boy, aged eight. Transverse fracture of lower end of humerous one inch above the epiphysis. There was marked induration and swelling around the elbow, and the anterior surface of the arm and forearm were covered with blebs, which

prevented treatment by flexion. An attempt was made to hold the arm at right angle by an external angular splint. Though the fragment was reduced it could not be held in place in the right-angled position. The arm was treated for a few days by the family physician until the blebs had disappeared, when the patient was put to bed with extension and counter-extension on the ninth day. A plate the next day showed the fragment much improved in position, but not perfectly reduced. Under ether on the thirteenth day the fragment was easily reduced as proved by the Roentgen plate a day later. Apparatus removed on the twenty-eighth day. The fragment was in perfect position, but induration around elbow still marked. Baking and passive movements begun. Case still under treatment, but marked improvement has been made in motion, and the function ought to be good.

Another difficult class of cases to handle is that involving both bones of the forearm. Here the problem of two broken bones, with four ends lying in as many different positions, taxes the skill and patience of the surgeon to the utmost. In setting one bone the fragments of the second bone may be forced out of place, and in attempting to remedy this, the fragments of the first bone, which have just been reduced, may be again disarranged. Many times it is impossible to make a proper reduction without an open operation. Here again without the Roentgen ray we are helplessly working in the dark. The same method is used as with the previous class of cases, except that I have never found it necessary to put the patient to bed. At times an intermediate plate, taken after one or two unsuccessful attempts at reduction have been made, will give the clue to the situation, and by applying force in the manner indicated by the plate, the bone will slip back into position.

Again two cases will illustrate the method used:

Case 3—Boy, aged eleven. Fracture of radius and ulna 1½ inches above the wrist in each bone. Reduction attempted unsuccessfully by another physician. Seen in consultation eight days later. Ether given and first attempt at reduction unsuccessful as to the ulna though the radius was put in fairly good position. The appearance of the plate made after this attempt led me to believe that mechanical force applied in a certain direction might effect the reduction. This was done and the subsequent plate showed the reduction satisfactorily accomplished.

Case still under treatment, but as the wrist joint is not involved, I see no reason why we may not expect a good result.

Case 4—Boy, aged eight. Fracture of radius and ulna about 1½ inches above the wrist in each bone. Reduction attempted twice under ether by a physician of whose skill in fracture work I have the highest opinion. In this case, guided by reference to Roentgen plates, I was able after two attempts to accomplish the reduction, which though not perfect, is satisfactory in a child with growing bones.

We have found in several cases, that reductions in children which seemed unsatisfactory from a Roentgenologic point of view, have shown perfect anatomical and functional results when plates were made a year later. As the bone grows a new medullary cavity is formed, and the bone becomes perfectly straight, usually showing no trace of ever having been fractured.

CONCLUSIONS.

The Roentgen ray, properly used, is an infallible control of fracture work.

Plates after reduction are an absolute necessity.

Plates before reduction are of great value in diagnosing the exact condition and in facilitating reduction.

Many cases now subjected to open operation and plating could be treated by extension and counter-extension after the method of Bardenheuer and Graessner with as good anatomical and functional results, and at less risk and greater comfort to the patient.

In many cases which seem irreducible, plates made while the patient is under ether and after successive attempts at reduction have been made, will often give the clue to the situation, enabling the reduction to be made without resorting to an open operation.

Some fractures are irreducible by the above methods and an open operation is necessary. In these cases an absorbable suture material should be used if possible, reserving wire and plates for cases in which the fragments can be held by no other means.

DISCUSSION.

DR. ARTHUR HOLDING, ALBANY, N. Y.: This is the sort of a paper we should give to our local medical societies. The laity believes that when the doctor says that he set the fracture he has gotten a perfect result. The majority of surgeons believe that when they have a good appearance on the outside they necessarily must have good approximation of the bone, but when a radiograph of the limb is made, it is often necessary to make some very trying explanations to the patient.

Only recently the use of plaster-of-Paris has gone out of vogue, and many other of the old-time tried methods have followed the plaster-of-Paris. Therefore, I was glad to hear Dr. Hammond speak of extension and counter-extension. In certain fractures this is a very necessary thing to do, and it is our duty to impress on the surgeon that this fracture work must be done differently from what it has, and that it must be controlled by the Roentgen ray. We cannot lay too much emphasis on this point. Fracture work will be more satisfactory to the surgeon and to the patient when it is controlled by the Roentgen ray.

Dr. Hammond mentioned the treatment of several varieties of fractures. I have found that the fractures which require the most attention and study with the Roentgen ray are the fractures at the shoulder and hip. In such cases the routine method of putting them up almost always increases the deformity, and while adequate methods have been described for the treatment of such fractures by authorities like Whitman, as, for instance, fracture of the neck of the femur, these methods unfortunately are used but little throughout the country. Instead of putting the leg up in flexion and abduction, and holding it in position so that the short fragment is in continuity with the long fragment, the general practice is to put the patient in bed and put on Buck's extension.

We must not be ashamed to advise the surgeon to sacrifice his pride and reset a bone when it is shown to be necessary by the Roenten ray. That is the great trouble we have to confront

all the time. The surgeon has not protected himself in most cases so that he can do the work over. He is a afraid to make a plain statement of facts to his patient. Once in a while we are in the trying position in which we have to protect both the patient and his surgeon,—not always a pleasing situation.

I would like to ask the doctor in relation to his treatment of epiphyseal separations at the elbow. One of the set rules of treating a fracture at the elbow is that if the olecranon process of the ulna is not broken, the arm should be put in acute flexion. In my experience that procedure does not work well when I tried it in two cases of epiphyseal separation. Certain fractures when we learn to study them with the Roentgen ray must be regarded in almost the same light as a major operation, and I feel convinced that the doctor is right in putting the patient to bed and putting on counter-extension to get a position of the fragments, and to keep that patient in bed for about as long a time as he would after a major operation. That is an important step in the right direction.

There is only one thing I have to offer in demurring to what Dr. Hammond said and that is with regard to the use of ether and immediately after to use the Roentgen ray. I have seen several instances where the spark has caused serious damage, even though the tube may not have been anywhere near the ether mask or can at all. The spark from the tube jumped to the iron bedstead and from there to the ether can. In one instance a serious conflagration resulted in which the patient was badly injured. I am not prepared to say that we should use chloroform to produce anesthesia, but when it is not contra-indicated I use it. If you use ether, be sure that the ether bottle is out of the room and that the mask is not anywhere near the patient when the tube is excited.

DR. LEWIS G. COLE, NEW YORK CITY: I think that Dr. Hammond has stated the principal objection to this method of examination, and that is the long time that it is necessary to keep the patient under the anesthetic if repeated attempts are made to radiograph him.

In the next issue of the Quarterly will be published a procedure which I use and which I think will aid us in overcoming the difficulty. While the method is not new, it may be new to

some of you. It is the use of bromide paper in place of plates. About ten years ago we were all working with bromide paper instead of plates. The advent of the screen has completely revolutionized this as it has stomach work and Roentgenology in general. By the use of bromide papers and the screen it is possible to make a radiograph which shows things with more detail than it is possible to obtain on the plate in from two to three minutes from the time the exposure is made. The first radiograph may be studied immediately after the second radiograph is made. The radiographs can be made as rapidly as it is possible to manipulate the machine.

This applies not only to fractures but to foreign bodies. It applies not only to the hands but to the spine or any other part of the body. The fact that the ray does not have to penetrate through the glass, the thickness of which varies with each manufacturer, naturally gives us a much better picture. I think you will see that the amount of rays which is cut off by this glass or screen is great and it can be done away with by simply passing the ray through the paper. The time of exposure is as short as one can possibly make it. You can use an exceedingly short exposure and use the entire output of the apparatus. For taking a picture of a frontal sinus in the antero-posterior position, the exposure by this method is about two seconds. I have been able to determine conditions by this method which I could not determine in any other way. It is most useful and entirely satisfactory..

DR. FRED H. ALBEE, NEW YORK CITY: I wonder whether everyone present today realizes the influence the Roentgen ray has had on the number of discussions held on the treatment of fractures. I think that the general surgeon was quite satisfied up to the advent of the Roentgen ray with the results he was getting in the treatment of most fractures, and it has been the Roentgen ray which has revealed to all of us that the treatment of fractures has been far from satisfactory. In fact it has been inefficient.

I want to speak especially of compound fractures of the hip and shoulder where it is impossible to determine by physical means the kind and extent of fracture or displacement without the Roentgen ray. We should plan the treatment entirely by what we find with the Roentgen ray.

In the case of the ulna there are two kinds of fractures which can be controlled entirely by flexion, without extension,—fracture of the epiphysis or near the epiphysis, the most common one is a separation of the lower corner of the humerus with a displacement of the head of the radius forward. The capsule that controls the head is firmly attached to that part of the lower end of the humerus, and when an injury occurs, with a powerful contraction of the biceps muscle, that piece of bone is pulled off and the corner of the humerus slides forward. That can be controlled absolutely by acute flexion. It pushes the head of the radius backward into position and also the fragment connected with it.

Another common fracture controlled by it is fracture of the upper part of the ulna, a dislocation forward of the head of the radius. Acute flexion will take care of that very nicely. If it is an early case you can by traction and pressing push the head of the radius back, and by acute flexion you can correct the angular deformity of the ulna. It also produces traction on the olecranon and pulls it into position.

As for epiphyseal fracture of the shoulder. Some years ago I was able to find that in a very large number of fractures of the shoulder in the neighborhood of the epiphyseal fracture, the head of the humerus was rolled up and in. The upper epiphysis of the humerus is unique in that all the rotary muscles of the shoulder are attached to it. It is the only instance in the body where that occurs. The action of these muscles pulls the head of the humerus upward and inward. It is impossible to control that upper fragment because no muscles acting on the arm lower down are attached to it. Therefore, traction is without any influence whatever. In my opinion the proper treatment of such a fracture is to place the arm high up on the chest and put on a spica bandage of plaster-of-Paris. It is an excellent material to use and the position is a comfortable one for the patient to endure, besides it is correct. You cannot control the upper fragment, therefore bring the lower fragment into position with the short fragment and hold it there. The long fragment can be controlled to that extent.

Whitman does the same thing in like fractures of the hip just below the great trochanter. These fractures have been treated for years by putting them up in a double inclined plane by abduction and flexion. The short trochanteric muscles pull the upper fragment into that position. The muscles are so powerful that we cannot control them by extension, therefore put

the long fragment into alignment with the short fragment. The same procedure can be applied to the knee.

If there is an epiphyseal separation of the lower end of the femur, the gastrocnemius muscle pulls the upper fragment back into the popliteal space, the epiphysis must get out of the way, so it slides forward. Flex the knee and the determining element in this position is removed.

In fracture of the oscalcis, which is not infrequent, the deforming element is ignored by the best surgeons. The foot is put up at right angles to the leg, the tendo Achilles pulls the fragment up, and if the foot is dressed in that position, the patient is bound to have a flat foot of the very worst kind. The arch of the foot is completely obliterated. The only way to put it up is to flex the foot strongly so that the posterior fragment is held down. If you cannot hold it down do a tenotomy on the tendo Achilles and pull the fragment down. Then you will get good union, preserve the arch and save the patient a deformed foot.

DR. GEO. C. JOHNSON, PITTSBURG: I am glad that the discussion has taken the trend it has. Why the abdominal surgeon should be competent to treat a case of fracture I have never been able to understand. The only man in my opinion who is competent to do this work is the orthopedic surgeon, the man who controls his results with the Roentgen ray. The treatment of fractures in our textbooks should be rewritten by men who know something about the subject. The principles of applied mechanics are little understood by most men who treat fractures.

There has been one point omitted in the discussion and that is the importance and necessity of making stereoscopic examinations of fractures about the shoulders. There is no other way in which one can make an exact diagnosis of the kind of fracture and the displacement of fragments. If you will do this you can direct the proper setting of such a fracture and get good results and at the same time give the patient comfort during the treatment and a useful arm afterward which must be considered. Practically every case must be treated in a different way.

DR. COTTON, BALTIMORE: I would like to emphasize the remarks made by Dr. Johnston and by Dr. Albee. It is the province of the orthopedic surgeon to treat fractures. He has a proper knowledge of the anatomy involved, how deformities are produced, what is necessary to reduce them and the necessary

mechanical ability to retain the fragments in a position so that the result will be a good one. If he also has a knowledge of what use the Roentgen ray is in this work, or has some one associated with him who can help in that direction, all these fractures can be treated in a most successful manner.

I think that this discussion has gone into the realm of general surgery rather than into Roentgenology. This is especially interesting at a time when so many surgeons recommend the open treatment of all fractures according to the method of Lane of London and Huntington of San Francisco and others.

It is a great mistake if men cannot appreciate the points brought out by Dr. Albee, how these deformities are produced and what must be done to reduce them. For instance, in a case of fracture of the supper end of the femur where the upper fragment is pulled upward and is rotated outward. The proper method to control that fracture is to release those muscles, reduce the fracture and keep the muscles relaxed. At the Mercy Hospital in Baltimore we use an apparatus made by Downey of Atlanta, Georgia. We put the limb in flexion and slight adbuction and outward rotation. We have used his table in about ten cases and in all we have had good union, good functional result, and in two or three cases there was absolutely no shortening and the patient was able to walk about in two and a half months. So, in fractures of the lower end of the femur if we appreciate that the upper fragment is drawn backward by the gastrocnemius muscle, we will reduce by flexion and not by extension.

The same principle applies to the shoulder and other joints. If we use these principles it is not necessary to resort to wires, screws or nails or any other retaining apparatus or appliance. If one sees the results accruing from the use of these measures, he will still more appreciate the value of conservatism in the treatment of any and all fractures. Another thing which we must remember is that it is absolutely necessary that we get an accurate apposition as well as good functional results. It is here that the Roentgen ray is the only means to be used.

DR. CLARENCE E. COON, SYRACUSE, N. Y.: There is no question that the orthopedists can treat fractures better than anyone else, but the fact remains that a large majority of all fractures have been and will be treated for many years to come by the general practitioner and not the surgeon. So that the effort we ought to make should be along the line as suggested by Dr. Hold-

ing, that of talking before the local medical society, give demonstrations of results obtained following the use of the Roentgen ray and show how these things can be accomplished. The Roentgenologist seldom treats a fracture. The proper man to this is the orthopedist, but much can be accomplished by the general practitioner if he will avail himself of the advantages offered by the Roentgen ray both in diagnosis and treatment.

DR. HAMMOND, closing the discussion: Dr. Holding spoke about the separation of the epiphysis at the elbow. I think that we must revolutionize our ideas as to treatment of fractures, and treat them not by textbook rules but by what we discover by Roentgen examination. It is stated in the textbooks that fractures of the olecranon should always be treated by extension. I have disregarded that in two cases, treating one with the arm in a right angle position and the other with the arm in acute flexion. If I had followed the textbook rule I would have separated the fragments, whereas by following the Roentgen ray I kept them in apposition. The results obtained in those two cases are proof of the correctness of the treatment.

As to ether and the Roentgen ray, I am very particular about that. The ether is removed to a distance, away over in the corner of the room, covered with wet towels and everything inflamable is removed before the tube is excited.

I was glad to hear Dr. Coles speak of how we can save time in this work. That was a weak point in my technic.

As to acute flexion, most elbow cases can be put in acute flexion, but we found one case which could not be held in acute flexion and it was a question of an open operation or something else, and I chose extension. It did the work, and the patient escaped an operation. The result was satisfactory.

X-RAY DOSAGE WITH A UNIPOLAR X-RAY TUBE.

BY SINCLAIR TOUSEY, A. M., M.D.
Consulting Surgeon, St. Bartholomew's Clinic, New York.

Unipolar X-ray tubes are intended for use in the mouth, vagina and other cavities. There is only one wire, leading through the insulated stem of the tube to the cathode and transmitting a high potential current from an Oudin resonator or from one pole of a Tesla transformer. The anode or anti-cathode is fastened to the inner wall of the tube; it has no wire connected with it; but receives an induced or condenser charge when the tube is in contact with the body and the generator is in operation.

The more one works with the X-ray the more important seems the matter of dosage. This is strikingly evident in the case of a single application, where a suitable exposure for radiography will produce no perceptible effect upon the tissues; where a suitable exposure for a single massive dose of X-ray for a therapeutic application will produce the desired effect of depilation in a case of ring-worm or of destruction and cure in a case of epithelioma; and where a single over-exposure either radiographic or therapeutic will produce a terrible burn and ulceration. But even in cases where a series of mild applications are required, the result may be either no effect or a very beneficial effect or an excessive one according to the strength and frequency of the applications.

One should try to measure the intensity of the X-ray produced by a unipolar tube when operated by his apparatus so as especially to find out how many minutes contact exposure would amount to 5½ Holzknecht units or produce erythema.

If one has an ordinary X-ray tube and apparatus and technique which is known to produce this effect in a certain number of minutes at a certain distance, the following test may be made: Expose parts of a photographic film in black envelopes to the ordinary X-ray at one's ordinary treatment distance and for same number of seconds as the number of minutes required for an "erythema dose." Then expose other parts of the same film

in black paper envelopes in close contact with the unipolar X-ray tube for different lengths of time; the same number of seconds as the exposure with the ordinary X-ray tube. Thus there will be four different parts of the plate exposed and from it one may be able to judge whether one-half or the same or twice the time of therapeutic exposure with the unipolar X-ray tube in contact with the tissues will produce the same erythema dose that one's ordinary X-ray tube, apparatus and technique will produce at one's ordinary distance for therapeutic applications.

Two precautions must be taken with the unipolar X-ray tubes; it must be in contact with a conductor having approximately the same capacity as the human body since it does not give nearly as strong a radiance when the end is simply held up in the air; and one must bear in mind that the intensity of the radiance varies universally as the square of the distance from the anticathode. The distance from the anticathode to the mucous membrane is an inch or less with a unipolar X-ray tube and the mucous membrane would on the ground of distance alone receive four times the intensity of radiation received by tissues an inch deep and nine times that of tissues at a depth of two inches. Then again the X-ray consists of vibrations of many different wave lengths and degrees of penetration and if at all a deep effect is desired those soft X-rays should be arrested which would all be absorbed by the mucous membrane and limit the dose to the amount which the mucous membrane could stand without a burn. These soft X-rays must be filtered out by a screen of aluminum or several thicknesses of leather enveloping the end of the tube. This allows only rays of greater penetration to pass, but it must still be remembered that the surface tissues are receiving many times a stronger dose of these than the deeper tissues.

This determines the limit of safety for a single application or as the total of a series applied during a couple of weeks and to be followed by a period of rest lasting two or three weeks. Ordinarily less than this will be applied, while for some ulcerative malignant growth even a considerably larger and therefor destructive dose is desirable.

The important part of this is to know how to produce the effect which the case calls for.

SYPHILITIC MANIFESTATIONS IN THE LUNGS, RESEMBLING PULMONARY TUBERCULOSIS WITH REPORT OF CASES.

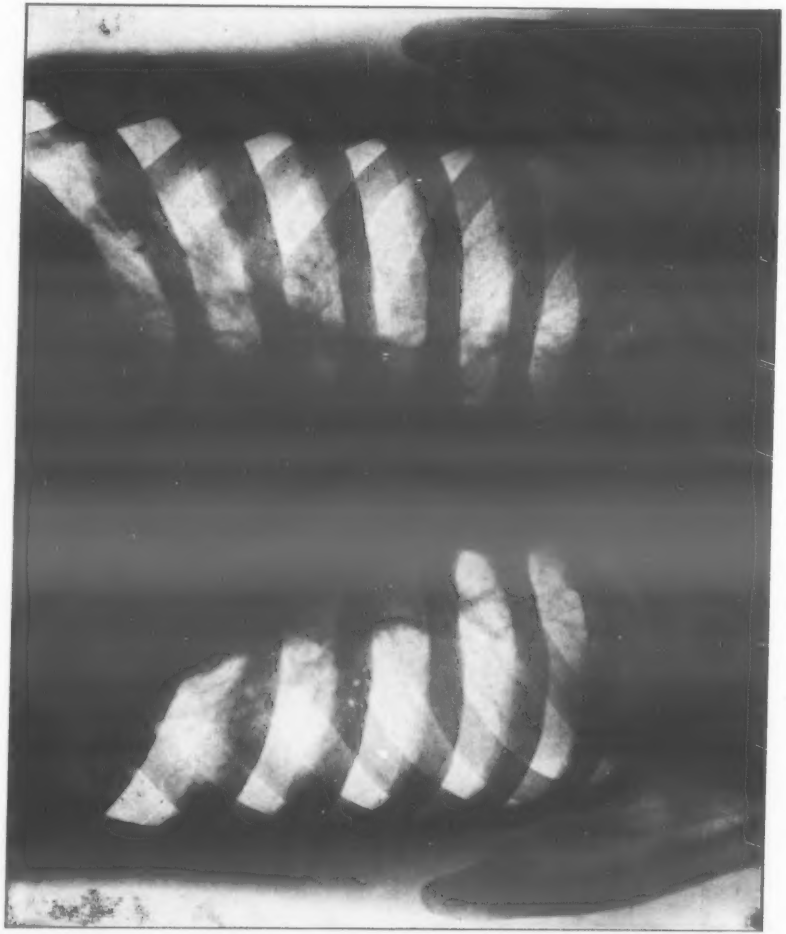
R. P. DANIELLS, M. D.
Attending Physician St. Vincent's Hospital, Chief of Staff Thalian Tuberculosis Dispensary, Toledo, Ohio.

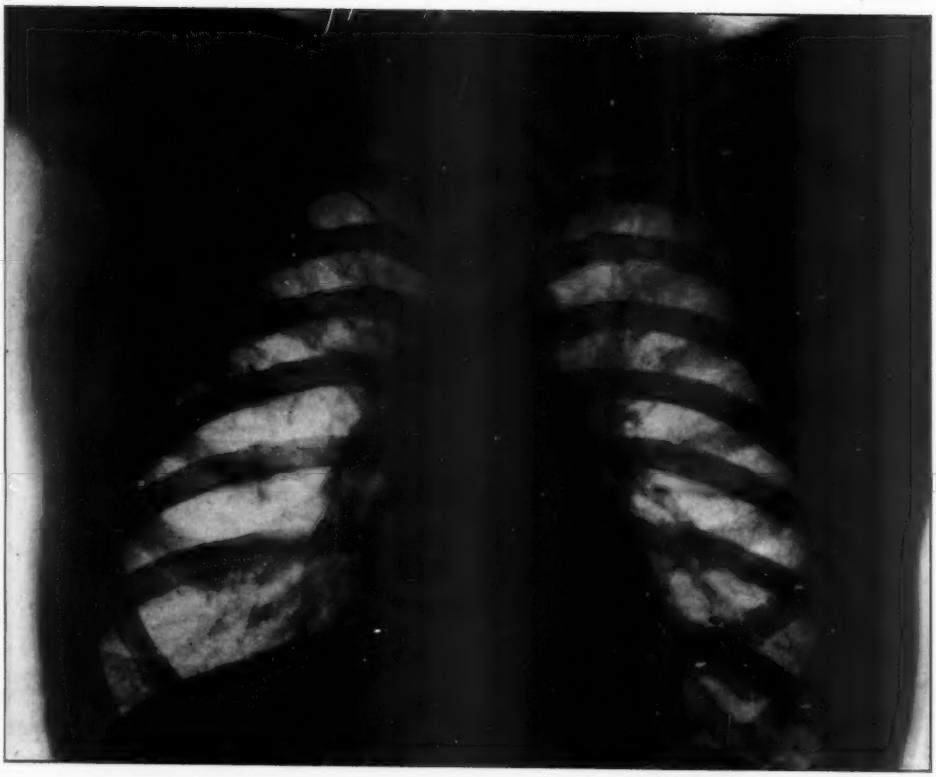
H. W. DACHTLER,
Roentgenologist to Toledo, St. Vincent's and Flower Hospitals, and the Thalian Tuberculosis Dispensary.

During the last three years, in examining about one hundred and fifty cases for pulmonary tuberculosis and studying the condition of the lungs with the help of the Roentgenograph, we found most of the cases to be uncomplicated tuberculosis; a few were mixed infections of tuberculosis and syphilis, while eight cases were seen in which the lung changes were due to syphilis, and which might easily have been mistaken for a pulmonary tuberculosis.

These eight cases consulted a physician because they were losing weight, running a slight temperature, some had a little dry cough; all were easily fatigued; and they or members of their families suspected beginning consumption.

These cases are reported because they suggest that a syphilitic condition occurs more frequently in the lung than is usually suspected, and because they may closely resemble the early stages of pulmonary tuberculosis. In all the cases tuberculosis has been eliminated, first, by no reaction to 12 mg. of Koch's old tuberculin given hypodermically, and, second, by no signs of tuberculosis demonstrable in the Roentgenographs.





Moreover, syphilitic infection has been proved either by a direct history of infection, or by a history of miscarriages with other syphilitic signs and symptoms, and in one case by the Wasserman reaction.

REPORT OF CASES.

CASE NO. I.—Male, age twenty-one years. C. F. B.

A. Reason for coming to physician.—Sent by father who feared patient was beginning to have consumption.

B. History.—Young man, single, clerk. Usual weight 175 to 180 pounds. Lost about 10 pounds during last four months. Has coughed for two months with some expectoration. Chills easily. Family history good, personal history negative, except as stated later.

C. Examination.—Percussion of lungs showed slight relative dullness in the upper part of right lung both before and behind; vocal fremitus increased over the same area. Crepitant and subcrepitant rales over both lungs. The apex of the heart was in the fifth intercostal space in the nipple line; soft mitral systolic murmur. Systolic blood pressure 105 m. m. of mercury by Stanton manometer. Hemoglobin 80% (Dare). Red blood cells, 4,640,000. Faint traces of albumin in urine, no casts. Slight rise in temperature every afternoon up to 99.5 F. Pulse slightly accelerated.

D. Proof of no tuberculous infection.—Did not react to 12 mg. of Koch's old tuberculin given hypodermically. Showed no tuberculous lesions, old or recent, in chest by Roentgenograph. Symptoms cleared up rapidly under anti-syphilitic treatment.

E. Proof of syphilitic infection.—History of infection and chancre nine months before. This history was not obtained at first as patient did not wish his father to know of the trouble.

F. Roentgenographic findings.—Heart enlarged, position is normal. On the right side the diaphragm curve is normal. On

the left side the diaphragm is obscured by an increase in density of the base of the left lung, probably due to edema. Glands in hilus of lungs diffusely enlarged, but do not present any typical, discrete, caseated, nor calcified nodes, diagnostic of tuberculosis. Normal markings of lungs exaggerated. Gumma of the right clavicle near the sternal junction. No tuberculous infiltration extending along the peri-bronchial lymphatics toward the apices or lung borders.

G. Remarks.—There were no signs of syphilis on examination except those in the lungs. The patient had been on mercury intermittently. He was put upon heavy anti-syphilitic treatment and made an excellent and rapid recovery.

CASE NO. II.—Man, aged twenty-eight years. C. C. W.

A. Reason for coming to physician.—Sent by family who feared he had consumption.

B. History.—Young man, single, engaged in office work. Weight three years ago 149 pounds; weight one year ago 135 pounds; weight at present 125 pounds. Slight catarrh in head, coughing for seven weeks, no expectoration. Chills easily. Family history good; personal history negative except as stated later.

C. Examination.—Percussion of lungs showed very slight relative dullness over right apex in front. Crepitant rales over both lungs both in front and behind. Excursion of diaphragm normal. Heart normal with the exception that the first sound was soft and not definite. Ulcer on posterior nasal pharynx. Urine negative. Elevation of temperature up to 100 and 100.5 F. every afternoon. Pulse rapid, 100 to 110.

D. Proof of no tuberculous infection.—Did not react to 12 mg. of Koch's old tuberculin given hypodermically. Showed no tuberculous lesions by Roentgenograph. Condition cleared up rapidly on anti-syphilitic treatment.

E. Proof of syphilitic infection.—History of infection two years and three months before. This information was not obtained at first examination as some of the family were present and patient would not tell it.

F. Roentgenographic findings.—Heart small and vertical, as frequently seen in tuberculosis. On right, adhesions between diaphragm and pericardium. Lung changes not marked, but normal markings exaggerated for this age (twenty-eight years.) No evidences of tuberculous infiltration.

G. Remarks.—Patient was put on suitable anti-syphilitic treatment and his symptoms quickly cleared up. There were no signs of syphilis except the ulcer in the pharynx, and the lung condition.

CASE NO. III.—Man, aged thirty-nine years. M. N. T.

A. Reason for coming to physician.—He was "running down," had no energy, looked badly, and was losing weight. Knew he had had syphilis, but did not believe his present symptoms were due to this, as he had taken a few weeks' cure at Hot Springs and had been told that the disease had been "boiled out." Thought he might have tuberculosis.

B. History.—Losing weight, night sweats, easily fatigued for last few weeks. Had elevation of temperature after exercise. Family history good; personal history negative except as stated.

C. Examination.—On percussion, slight relative dullness in upper third of right lung. Crepitant rales over both lungs in front and behind. Excursion of diaphragm good. Apex of heart in fifth intercostal space in nipple line. Heart dullness extended a little to right of sternum. Soft mitral systolic murmur. Hemoglobin 84% (Dare). Red blood cells, 4,560,000. Systolic blood pressure 95 m. m. Hg. by Stanton. Slight traces of albumin in urine, a few granular casts. Rise in temperature each afternoon. Pulse soft, regular, accelerated.

D. Proof of no tuberculous infection.—Did not react to 12 mg. of Koch's old tuberculin given hypodermically. Roentgenograph showed no tuberculous lesions in lungs.

E. Proof of syphilitic infection.—History of infection twelve years before.

F. Roentgenographic findings.—Heart enlarged. Adhesion of inner border of diaphragm to pericardium. Some increase of density along the larger vessels and bronchi. No lesions char-

acteristic of an old tuberculosis nor any evidence of a new tuberculous infiltration from the peri-bronchial glands. *Roentgenograph of the lungs obtained post mortem did not show the slightest evidence of any tuberculous condition.*

G. Remarks.—Patient did not do well on anti-syphilitic treatment. During the last month he developed an acute nephritis on top of his former kidney irritation. Patient grew slowly worse, but was up and around to within a few weeks of his death, which occurred four months after first examination and which was due primarily to a myocarditis.

H. Postmortem report.—Autospy done two hours after death. Lungs were found to be free from pleural adhesions and normal in every respect. Heart showed dilatation, with very little hypertrophy. Fine fibrous threads bound the heart to the pericardium everywhere. The muscle was very soft and flabby, the heart falling over the hand when held up by the apex. The valves did not show vegetations nor atheroma; the aortic valve held water. The aorta showed plaques of beginning atheroma. Coronary arteries showed some hardening. Signs of a chronic pericarditis and myocarditis were well marked, but there were very few signs of an old endocarditis. The kidneys were larger than normal, hard, firm and swollen. The liver was somewhat larger than normal, its surface marked with small pittings like the skin of an orange. Microscopical sections of the liver and kidneys showed increase in connective tissue. In other respects the post-mortem was negative.

CASE NO. IV.—Woman, age twenty-eight years. C. M.

A. Reason for coming to physician.—Not feeling well, losing weight, pain in chest, some cough, no expectoration.

B. History.—Woman, age twenty-eight, had been married, seamstress. Weight one year ago 135, weight now 108 pounds. Right breast had been removed two years before for carcinoma, no recurrence. Usually well and able to work. Had pleurisy pains in left chest, tenderness along some of the ribs, occasionally had a little fever. Menstruation irregular.

C. Examination.—On percussion, relative dullness over upper third of right lung, both in front and behind. Subcrepitant rales more or less all over both lungs. Friction sounds to left of heart in left axillary line. Excursion of diaphragm good. First sound of heart soft and not well defined. Heart not enlarged. Urine negative. Temperature ranged from 97° to 99° F. Pulse somewhat accelerated.

D. Proof of no tuberculous infection.—Did not react to 12 mg. of Koch's old tuberculin, Roentgenograph showed no indication of tuberculosis. Trouble cleared up on potassium iodide and mercury.

E. Proof of syphilitic infection.—History of infection two years before, with treatment intermittently. Gave a positive Wasserman reaction.

F. Roentgenographic findings.—Heart slightly smaller than normal. Some increase in lung density, most marked at hilus. Normal markings much exaggerated for her age. The apparent difference in density of the two sides is due to the fact that one breast has been removed for carcinoma. Gumma of left clavicle at the inner third which had to be differentiated from metastatic carcinoma. No evidences of tuberculosis.

G. Remarks.—Pleurisy improved greatly and general condition became much better when put on mercury and potassium iodide. Patient still under treatment and improving.

CASE NO. V.—Woman, age thirty-seven years. B. C. W.

A. Reason for coming to physician.—Indigestion, losing weight, running a temperature, cough and expectoration, generally "worn out."

B. History.—Woman, married, age thirty-seven. Usual weight 135, weight one year ago 100, weight now 87 pounds. Has cough with expectoration, vomits on account of cough. Appetite fair, has some constipation. Menstruation regular, flows four days. Has had three children living and three miscarriages. Severe "rheumatic" pains in legs.

C. Examination.—On percussion, upper half of right lung relatively dull, vocal fremitus increased, moist, crepitant, and sub-

crepitant rales. In the left lung, crepitant rales, old thickened pleura. Heart negative; urine negative. Temperature runs up to 99.5° nearly every day. Repeated examinations of sputum showed no tubercle bacilli. Lymphatic glands everywhere enlarged. Liver enlarged. Pupillary reflex gone, patellar reflex gone. Examination of eye showed beginning optic atrophy.

D. Proof of no tuberculous infection.—Did not react to Koch's old tuberculin. Roentgenograph showed no signs of tuberculosis in lungs. Improved promptly on potassium iodide and mercury.

E. Proof of syphilitic infection.—No direct history of infection could be obtained, but patient had had three miscarriages, had no patellar reflex, no eye reflexes, optic atrophy, and suddenly, while under treatment, had a paralysis of the muscles of the left eye. Patient stood large doses of potassium iodide, 180 grains per day for three months. Rheumatic pains left and patient gained in weight.

F. Roentgenographic findings.—Heart normal in size. Calcification of cartilage of first rib. Increased density of lower right lung. No evidences of old tuberculous lesions. Apices clear.

G. Remarks.—Lung condition has cleared up. Patient seems to be developing tabes dorsalis.

CASE NO. VI.—Woman, age thirty-four years. L. C.

A. Reason for coming to physician.—Cough, suddenly became cross-eyed. Some expectoration.

B. History.—Woman, age thirty-four, married fifteen years. Has had slight loss in weight, during last year. Is very nervous. has cough with expectoration. Six weeks before examination suddenly developed paralysis of external oblique muscle of left eye. Has "rheumatic" pains in legs and "all over." Has had cystitis badly. History of sores on labia years ago. History of many miscarriages.

C. Examination—On percussion, both apices dull, vocal fremitus increased on right side. Rales over both lungs, large and moist on left side. Heart negative; urine negative. Elevation of temperature each afternoon.

D. Proof of no tuberculous infection.—Did not react to 12 mg. of Koch's old tuberculin. Rapid improvement on anti-syphilitic treatment.

E. Proof of syphilitic infection.—History of pregnancies: 1894, miscarriage at 7 months. 1895, child born at term, died at 7 weeks. 1896, child born at term, living. 1898, child born at term, living. Since then has had twelve consecutive miscarriages.

F. Remarks.—Is well after continued anti-syphilitic treatment.

CASE NO. VII.—Young man, age twenty-one years. H. A. E.

A. Reason for coming to physician.—Losing weight, coughed, had expectoration each morning. Told by his physician that he had consumption.

B. History.—Male, twenty-one years, unmarried, office work, weighed one year ago 145 lbs. This is the heaviest he had ever been. Weighed on first examination 133 lbs. Was getting pale, losing strength, had a cough with some expectoration on rising in the morning. He had been to one of the very best sanitariums and health resorts in this country where he was told that he did not have tuberculosis, but the true cause of his complaint was not told him. He was referred back to his family physician, who had sent him away with a diagnosis of pulmonary tuberculosis. Knowing that something was wrong with him, the sanitarium physician telling him he did not have tuberculosis and his family physician telling him he did, he came to us for examination and a diagnosis, sent by one of our old patients.

C. Examination.—Slight relative dullness over upper half of right lung in front and behind. Vocal fremitus increased behind, and in supraclavicular space in front. Crepitant rales over both lungs and sub-crepitant over right lung upper half. Excursion of diaphragm normal. Heart enlarged. Apex in fifth intercostal space, one-half inch outside nipple line, first sound of the heart soft and blowing. Blood pressure 120 M. M. mercury Stanton manometer. Temperature 97.4 at 9 A. M. Later the temperature range was found over two weeks to be from 97° to 98.6°. Pulse 92, soft. Haemoglobin 90% (Dare.) Cervical lymphatics enlarged, especially those under the chin and in front of the neck. Trace of albumin in urine. No casts.

D. Proof of no tuberculous infection.—Repeated examinations of sputum showed no tubercle bacilli. Did not react to 12 mg. Koch's old tuberculin in one dose.

E. Proof of syphilitic infection.—History of chancre on lip 2½ years before, known to have been received from a kiss. Patient did not try to conceal this infection, but did not think of it in connection with his present trouble.

F. Roentgenographic findings.—Heart enlarged. Diaphragm normal. Marked ossification in first costal cartilage. No marked increase in density of hilus shadows. No old calcified lesions of tuberculosis. No evidence of a new tuberculous infiltration.

G. Remarks.—Patient has now been under our treatment with heavy doses of mercury for a year and a half. Has long been symptomatically well. In six months he reached 150 lbs., a gain of 17 lbs., and more than he had ever weighed before.

CASE NO. VIII.—Man, age twenty-one. F. H.

A. Reason for coming to physician.—Coughed, felt very badly, weak, could not work.

B. History.—Patient thought he had consumption and presented himself at the Thalian Tuberculosis Dispensary for examination. He had cough, expectoration, fever, sweats, chills easily, lost 12 lbs. in 6 months, appetite poor, no gastric disturbances.

C. Examination.—Relative dullness right supra-clavicular region. Sub-crepitant, crepitant and moist rales over lungs. Heart negative. Chest of long narrow type. Further examination negative.

D. Proof of no tuberculosis infection.—No bacilli in sputum. No reaction to 12 mg. Koch's old tuberculin given at one injection.

E. Proof of syphilitic infection.—History of syphilitic infection one year before.

F. Roentgenographic findings.—Increased density of hilus shadows apparently due to diffuse enlargement of glands, otherwise normal.

B. Remarks.—Patient has been under active anti-syphilitic treatment for nine months—is to all appearance well, has been working for several months. The only danger is that he feels so well he will not continue his mercury as long as is advisable.

CONCLUSIONS.

First, that during the secondary stage of syphilis, and even after gumma formation has begun, there may be a catarrhal bronchitis which closely resembles beginning tuberculosis, but which can be rapidly cured by anti-syphilitic treatment.

Second, that the catarrhal signs are general over both lungs and not localized, nor limited to the apices.

Third, that accompanying this catarrh there may be cough and expectoration, moderate elevation of temperature, emaciation, night sweats, loss of strength, and general debility, all of which symptoms resemble pulmonary tuberculosis, but which clear up rapidly upon the administration of mercury; much faster than a tuberculous process could under any treatment.

Fourth, it seems probable that, where cases of pulmonary tuberculosis treated with mercury and potassium iodide have shown great and rapid improvement, the condition has been one of syphilis or of syphilis and tuberculosis combined.

Fifth, from the study of these cases we believe that a syphilitic condition of the lungs occurs more frequently than is usually suspected and that, without doubt, it is often treated for pulmonary tuberculosis.

Sixth, all our cases have shown a relatively low blood pressure.

CARCINOMATOSIS OF THE BONE, SECONDARY TO A GROWTH IN SOME EPITHELIAL ORGAN.

BY RUSSELL H. BOGGS, M. D., PITTSBURG, PA.

Carcinomatosis of the bone has received very little attention from the fact that the bony changes in most cases have not been sufficient to excite clinical notice. Since so much attention is now given to bone diseases, some of these cases are now being referred for radiographic examinations. The disease is never primary, always secondary. For this reason it is seldom recognized until a fracture takes place.

The first case that I saw was a patient who had been operated upon for carcinoma of the breast five years previous. She had had three operations, one three years after the first, and the third a year later. Her first symptoms were of severe pain in the region of the right hip and sacroiliac articulation. She had a few nodules studded over the chest, which cleared up under X-ray treatment. She had complained of the pelvis symptoms a month before she started to take treatment. Her physician insisted that she was hysterical and had become addicted to morphine.

While stepping off an elevator, she made a misstep and complained so much of pain that we were compelled to give her a half grain of morphine. Neither her physician nor myself made any examination of her hip, but a month later she insisted on having a surgical consultation. The surgeon at once pronounced a dislocation of the head of the femur and referred her for an X-ray examination.

The examination revealed bony changes, which might be described as honeycombing of the shaft.

I have seen three similar cases where spontaneous fractures occurred following carcinoma and three more cases where the spine and pelvic bones were affected.

Dr. G. W. Hawley describes a similar case to the one I reported and has dealt in detail with skeletal carcinomatosis in an article which was published in the Annals of Surgery, May, 1910.

I would like to mention another case briefly on account of extensive bony destruction in addition to mediastinal involvement.

This patient was operated upon six years ago for early schirrous carcinoma of the breast. She was in fairly good health for three and one-half years. Then she began to complain of pain in the lumbar spine and sacroiliac region. The pain was constant and she soon became bedfast. The radiograms showed extensive bony changes in the pelvis, spine and ribs. About a year later, radiograms were again taken, which showed very little more bony destruction. This patient did not have any external recurrence.

The cases mentioned were secondary to chirrous carcinoma of the breast, and none of the patients had a recurrence in from three to five years. This would seem that carcinoma of the bone is much more common in a slow growing form than a tumor of rapid growth.

I will quote the following in regard to the pathology from Dr. Hawley's article, as he describes it:

"Von Rencklinghausen found that the invasion began in marrow, which was usually found studded with nodules of cancer tissue. In the long bones these occurred most frequently in the expanded extremities; in the vertebrae throughout their bodies. This is in accord with the theory that the invasion of the bone occurs via the blood stream since Lexer has pointed out that the metaphyses are the most vascular parts of bone.

"These cancer nodules (usually found in groups) rarely attained any great size. Occasionally it was more miliary in character.

"This invasion of the marrow leads to a low grade osteoporosis (called by Von Rencklinghausen, 'osteomalacia carcinomatosa') which often extends from the central canal to the periosteum, with nests of cancer cells scattered throughout the Haversian canals. Extension to the periosteum is productive of a fibro-periostitis with formation of new bone. New bone formation also occurs in the marrow. These two processes, osteolastic and osteoplastic, as a rule, are not productive of extensive alteration in the architecture of bone."

In conclusion, carcinoma of the bone is not so rare as generally supposed and it is of clinical interest in connection with lumbago, chronic rheumatism, etc.

It has even been stated that metastasis in the bone is frequently the first evidence of a prostatic tumor.

DISCUSSION.

DR. HENRY K. PANCOAST, PHILADELPHIA: I recall two cases of metastatic carcinoma of bone occurring at points distant from the primary lesion. One was a case of carcinoma of the breast of long standing, in which a metastasis occurred in the femur just below the great trochanter eight years after the breast was removed. Another was a case of carcinomatous degeneration of a branchial cyst in which the growth was removed and the patient given post-operative treatment. The metastasis occurred in exactly the same place. The post-operative treatment had been continued for several weeks when the patient complained of pain in the hip. I did not pay much attention to the patient until I saw the first case in which metastasis occurred. I then made a careful examination of the hips and found a beginning area of osteoporosis in exactly the same place as in Dr. Boggs' case.

It seemed significant that both these lesions which came from distant parts should occur in the same place exactly in both cases. I am also familiar with cases of metastases in the vertebrae. I merely mention the two cases because of the peculiar coincidence of the location.

DR. GEORGE E. PFAHLER, PHILADELPHIA: I am sure that if we look for these cases more carefully that we will find them more common than we believe them to be. We will find that these patients who complain of vague rheumatic pains after operation not infrequently have a metastasis in the bones. Unfortunately we do not, as a rule, look for any such trouble, even when there is a recurrence of the primary growth in the scar or elsewhere. Unless the patient has sustained a fracture, the condition is usually overlooked.

Not long ago I saw a patient who had a recurrent carcinoma in the chest. He had fallen and broken an arm. I examined the arm and found evidence of a metastatic carcinoma. I also examined the other arm and found metastasis there as well as in the thigh.

Two excellent papers have appeared in the German literature dealing with metastatic carcinoma in bone, one of the bones in general, the other of the spine. One man studied about 600 cases and his findings are most interesting. I am sorry that I cannot recall the reference in detail.

Another case that was exceedingly interesting, was that of an old woman who fell and struck her hip. It was believed that she had sustained an intracapsular fracture, and the surgeon in charge did not at first deem an examination with the Roentgen ray necessary. When that was done, there was found distinct evidence of a metastatic carcinoma. I then saw the patient and inquired whether she had had an operation at any time, and she answered in the negative. She had never had any symptoms indicating disease in any other viscus. I went over her very carefully and found a very small carcinoma in the breast, proving conclusively that you may have a secondary metastasis before the patient is aware of the presence of the primary lesion.

DR. KENNON, DUNHAM, CINCINNATI: Dr. Baetjer has had quite a remarkable experience with bone cysts. I wish he would point out the differences between these rarefactions and cysts.

DR. F. H. BAETJER, BALTIMORE: I have seen quite a number of cases of carcinoma metastases in bone, and it is rather curious how they locate. I have had four cases of carinoma of the femur where the primary growth was in the breast. The next

place to look for these metastases is in the spine. It seems that the spine and the femur are the most frequent sites for these carcinoma metastases. I have had two cases of metastases in the humerus, both following a carcinoma of the stomach.

About two months ago a patient came to me with an osteomyelitis. The Roentgen examination showed extensive metastatic carcinoma involving about four inches of the bone. It was not fractured. It was moth-eaten. I reported a malignant growth, either sarcoma or carcinoma. The case was gone over rather hurriedly in the Out-patient Department and no growth could be found. She was advised to go to the hospital, but would not do so.

Nearly four months afterward she entered the hospital on the gynecologic side complaining of urinary symptoms. Examination disclosed a carcinoma of the bladder.

In a case of extensive carcinoma of the breast metastasis occurred in the femur and in the scapula. Then, we had one very curious case of carcinoma of the humerus. When we cut into it we were unable to tell whether it was a carcinoma or a sarcoma. It proved to be a carcinoma. The patient died. We were unable to find the primary growth at the necropsy.

As to the bone cysts. These are not malignant growths. They are benign. The only condition with which a bone cyst may be confused is a giant celled sarcoma, and that is practically a benign growth. In the ordinary carcinoma and sarcoma there is a focus in the bone, and on account of the wildness and rapidity of the growth, it spreads outward like spokes in a wheel. In the cyst the cortex of the bone limits the growth to a certain extent. The growth extends upward and downward in the shaft, but does not break through the bone. In the giant celled sarcoma the bone is swollen, bulges, with trabeculae where the bone has not been destroyed entirely. There is a very thin shell which is uniformly bulging. In the case of the carcinoma the growth extends out into the soft tissues. It is essentially a destructive growth, whereas the bone cyst is not.

Now and then you will see a bone cyst where one cannot say just what it is, but as a general rule, a growth that extends up and down the shaft of a bone, without breaking through the cortex is a benign and not a malignant affair.

DR. GEORGE H. STOVER, DENVER, COLO.: I have had occasion to examine four patients showing metastatic carcinoma of the bone, and in each case the primary lesion was in the breast. In

two of the cases the metastasis was in the humerus. In one case the condition was discovered accidentally twenty-five years after the original operation on the breast when the patient sustained a fracture of the bone.

DR. CLARENCE E. SKINNER, NEW HAVEN, CONN.: One case I saw may be of interest because of the oddity. The patient, a man, was sent to the hospital with a diagnosis of rheumatism of the neck. He held his head very stiffly and he had suffered much pain for about two years. Fourteen years before he had had a tumor removed from his breast. Twelve years afterward there was a recurrence in the scar. That certainly was a rather remarkable case.

DR. H. W. DACHTLER, TOLEDO, OHIO: My experience has been that these cases are rapidly fatal. I would like to know whether Dr. Boggs' patient is still alive.

DR. BOGGS: No, the patient is dead, but she lived six years.

DR. PANCOAST: Both the cases I cited were pathologic fractures. One patient lived long enough to get union.

DR. J. HUNTER SELBY, ROCHESTER, MINN.: I have had seven cases all together that were diagnosed as metastatic carcinoma. Two were in the upper extremity of the femur. One was a general carcinomatosis, so general, in fact, that we were afraid to make an absolute diagnosis. I rayed every bone in the body, except the head. The patient had been operated on two years before, a radical operation being done on the right breast and about two and a half years after the operation this condition came on. She was brought in on a stretcher and had such intense pain that we could not examine her readily. At last report that patient was still alive, although the prediction was made that she could not live more than two or three months.

I recall another case, one of tumor of the kidney which was removed. A year and a half afterward the patient had pain like sciatica, and she was treated for sciatica. When I made the

first plate I found a total destruction of the ospubes, extending to the acetabulum, and in another to the spine. None of my patients had a metastasis in the humerus.

I agree with Dr. Pfahler that if we look for these things we will find them oftener.

DR. BOGGS, CLOSING THE DISCUSSION: Just before leaving home I looked up some of the literature on these cases. I found that 14 per cent of cases of breast carcinoma have bone metastases, and 37 per cent of recurrences take place in thyroid carcinomas; 72 per cent of cases of prostatic carcinomas have no metastases. I think it was Dr. Kaufmann who collected 100 cases of prostatic carcinoma.

THE IMPORTANCE OF THE PROPER UNDERSTANDING OF THE RELATION OF THE ABDOMINAL VISCERA IN THE TREATMENT OF AUTOINTOXICATION AND AUTOINFECTION.

BY DR. JOEL E. GOLDTHWAIT, BOSTON, MASS.

The advent of the Rotengen ray set me thinking, and made me realize that while certain things had been met with often before, we had failed to recognize them, and that the Roentgen ray would in all probability help us to discover them and give these patients some relief at least.

My work has to do almost entirely with chronic medicine, and while bone and joint lesions represent perhaps the majority of conditions, how many paralyses come to the orthopedist sooner or later to get his opinion. My attitude toward the progressive paralyses has come to be much the same as my attitude toward rheumatism or tuberculous joint diseases; that there is some way out for these patients, and we must find that way. If we can find it, there is some satisfaction in our work which does not consist in putting on braces and giving exercises, which may help temporarily, but shortly cease to be of assistance.

My plea to you is that you study these cases as they come to you, and try to show in the plate all there is to show, because many times plates are seen where there are shown things that are as plain as the a-b-c, and yet the proper interpretation is missed by the medical profession, and even by the Roentgenologist. In other words, I am perfectly sure that if we will try not only to see what the Roentgen ray shows but the relation of what is shown to the general health of the individual, you will improve vastly the specialty in which you are all interested and widen the scope beyond that of mere technical value.

I have a series of plates which will show my feeling in regard to those conditions. In the first place, in the chest and abdomen we have the important viscera of the body, all except the brain, and the proper relation of these viscera, one to the other, determines health or determines disease. The Roentgen ray is of the greatest assistance in determining not only diseased conditions of these organs, but the position of these organs, and

not only the position of the particular organ which may be shown in the Roentgenogram, but the necessary result which must accrue to some other organ because of the position which the organ shown on the plate may have. And it is quite as much that which is not shown, but which we must see by reason and intelligence, that is often of the greatest value in the plate itself.

If the organs of the body are in correct relation to one another, the normal functions go on without interference; if, on the other hand, one organ is out of place, it is not only the one organ that is out of place, because all organs have distinct relations one to the others. The organ which is out of place may not suffer, but it may push some other organ out of place and make that organ suffer very materially. The thoracic organs may crowd and modify by change of posture the abdominal viscera which are more easily affected, because in place of the rigid thoracic wall you have simply a soft muscular wall behind which are more organs than in the thorax, organs which are much more mobile in anatomic relation and in which you have not only the organ itself, but in which you place the food products and material which have a distinct relation to health and the function of the individual part. Remember that one out of every five persons is born without normal supports of the abdominal organs. In the process of evolution the quadruped has a free attachment of its organs; they hang freely from the backbone, and there is no interference one with the other; everything is hanging from one line. When you make the quadruped a biped, you change the relation of these organs, and Nature provided that these organs should have a certain relationship to one another. The scheme of development is a definite one, and differs for each kind of animal only in the degree of progress that is made. The human is the last stage; the fish and bird stage come early; the changes which determine the human from the quadruped come later, and since that is the last stage it is the one which fails most often, and that is why one out of every five persons is born a quadruped.

That necessarily does not do any harm in itself so far as causing disease is concerned, and that is one of the first things I want to emphasize.

There has been a great deal of misunderstanding in that the Roentgen ray may show an extreme degree of ptosis of some organ, or a malposition, and yet that may not be of any special importance as a cause of disease.

A patient came to me with back pains. She was out of poise;

she had a sacroiliac strain because she was standing out of poise, and there was a visceral strain in front which was dragging her forward. If a person's viscera are hung from the diaphragm in the back, it leads to a droop posture, which this patient had. This patient had symptoms coming from this. The stomach was found to be down in the pelvis. To unload that stomach she had to get the waste to a higher level so as to pass on into the duodenum, and she retained her food for a longer time than was necessary, unless she assumed a certain posture. Her colon was practically below the crest of the ileum. That can only happen when there is a free mesentery on the ascending and descending colon. That woman had the visceral support of a quadruped and not of the human species. She got rid of the waste all right so that she did not suffer from autointoxication.

In these cases we must not simply see a prolapsed stomach or colon, but the general prolapse which is present. It is not simply the stomach and colon, but there is also a loose liver and loose kidneys. All the organs are free and loose. There is a mobile kidney.

In all of these cases there is no retroperitoneal fat. It either never was present or else it has been absorbed. There is no shelf for the kidney, and it is free and loose. To sew up the stomach is not enough to give relief in these cases.

There are certain ear-marks shown by these patients so that you can recognize the existence of this condition at sight, but you cannot tell the degree of malposition.

In another case the stomach was almost in its normal position. The waste was passed on into the duodenum comparatively easy. The second picture taken of that patient was of interest. The patient had a hypertrophic arthritis of his hip. That man had an acquired ptosis of the hepatic angle of the colon as the result of posture. If a person drops forward the ribs are pushed back; that pushes the stomach and liver back and down, and the hepatic flexure of the colon comes under the liver, and you get what this man had. The waste got into the ascending colon all right, but it was held back at the hepatic flexure and it was very slow in going through the colon.

Another man had a stomach not much lower than normal, as many individuals have, and it need not necessarily cause any inconvenience; but when taken in connection with a series of pictures that was made it is of significance. In six hours the food left the stomach and small intestine and was in the ascend-

ing colon and first part of the transverse colon. Two hours later some of the liquid had been absorbed, but the waste has not traveled any farther. Three hours later, or eleven hours after the ingestion of the meal, the waste is still in the same position, stopping, as before, near the splenic flexure. Twenty-four hours after the first picture was taken, some of the waste is seen in the splenic flexure, where it should be, under the ribs. But whatever has got there is seen to be in scybalous masses; the bulk of the waste is still in the ascending colon and first portion of the transverse colon. That means that there is something wrong. For eighteen hours the waste has failed to move.

A second picture was taken an hour and a half after the first. The stomach is seen to be unloading itself and most of the food is down in the small intestines. It is going through pretty well. In the third picture, taken three hours and fifteen minutes after the first, the stomach is seen to have unloaded itself; the small intestine has completed its work, and the food is in the colon. The ascending colon is down almost below the crest of the ileum; the transverse colon has sagged, but the descending colon is in its normal position. Here Nature's plan has partly worked out.

The next case I studied was that of a child. That shows that this condition is congenital as well as acquired. The child was six years old; all crippled up with rheumatism, a condition which was present since the child was a year and a half old. The child then had dysentary, and after that gradually developed rheumatism. The stomach was way down at the ileum. Of course, that was not the maximum amount of sag, but we can not change the condition of a child born with little support for its viscera. That child could live well as a quadruped. It would not have any symptoms, but as it is, the condition will go from bad to worse. That child is partly human and partly quadruped. There is a freer attachment for the stomach than there should be; the ascending colon is way out of place; the descending colon is in normal position. There is a dragging here all the time, so that the food and waste pass through the bowel with much difficulty. Here the Roentgen ray is of great value in determining the conditions present.

In the work we have been carrying almost every combination has been found, a firmly attached ascending colon with a free descending colon. The ascending colon in one case was free, except for about two inches in its middle, and the upper

part was folded over that and in the sigmoid was a great deal of gas. There are all sorts of combinations, but with the same fundamental trouble behind them all.

In six hours the liquids have been absorbed and the waste is worked together into a bolus. You can see plainly the gas areas in all the pictures taken of this child. In eighteen hours almost all of the waste has been passed through and it is out of the body in that time. But the thing that is striking is that in this ascending colon is still present a part of the bismuth meal. A patient may have a regular movement of the bowels, and yet in the pockets and pouches formed where the colon has been blown up and distended there are masses of fecal matter so firmly caked on the side that a blunt dissector is needed to loosen them.

That is what the Roentgen ray will demonstrate to you in these cases. It will show you what is present and also tell you what must be done to establish normal anatomic conditions, and until you correct these misplacements and malpositions, you can work from now until doomsday and not relieve these patients from their distressing symptoms.

In another case, a stomach large and distended was far down below the crest of the ileum. Usually the stomach is on the left side, but in this case it was on the right side. There was a free mesentery on the ascending colon, but the splenic flexure was in position. If the colon is in place, the stomach can not get out of place; the ascending and transverse colon is the natural ligament of the stomach. In this case, six hours afterward the stomach and small intestine had unloaded themselves; in twelve hours the liquid was absorbed, but the ascending colon was filled with waste, and little of it is seen in the transverse colon. In twenty-four hours most of the material has worked its way uphill, but some of it is still seen in the transverse colon and ascending colon. You can tell at once the rapidity with which the organs are working. In the case of the individual with the hypertrophic form of arthritis the question was what was making his organs work wrongly. Six hours after the ingestion of food there is still a lot of it in the stomach.

These things mean something more than just a picture with a shadow on it, and the thing we must do is to put our minds to work and take a series of pictures. If one picture does not show everything, take another, and study that until you know what the relation of the viscera is. Then stop and think of what

the effect must be on the other viscera, and you will explain a lot of things now only partly understood.

It is easy, for instance, to diagnose gall-stones and remove them. But what has caused their formation? In many of these cases you will find mechanical displacements which easily cause a kink, and which causes all the symptoms. You can not relieve these patients until you get those viscera to work right. The same is true of a loose kidney. Many of these patients can be benefited by the help which you get from the Roentgen ray and with proper training and study you can hold these organs in place. The treatment must be checked up with the Roentgen ray until you get the desired result. These patients must be nourished until you can see the retroperitoneal fat which they all lack. You can not keep these organs up in place when the chest is narrow or the body is compressed by the corset. You must make it possible to have the ribs flare so that these organs can stay in place.

The type of cases in which you have congenital ptosis is perfectly definite and you can recognize them at sight. These individuals lack poise and correct posture. The posture is the result of the ptosis. The Roentgen ray will show you and the patient just what is the trouble, and it indicates the treatment which must be pursued.

In normal cases with the viscera supported properly you have good nutrition. A heavy person, for instance, flops down and the ribs drop in pushing the liver and stomach downward, which may interfere with the colon and many other things. That condition is not congenital; it is acquired and causes quite as much disturbance as the cases in which there is a complete ptosis with absolutely free attachment of all the viscera.

That is the point to remember, and that is one of the chief things we must impress on the surgeon and physician. True, all the people who have these conditions are not sick, but, remember that one out of every five individuals is born with his organs out of place; but there is the functional condition, and it may cause trouble at any time.

DISCUSSION ON DR. GOLDTHWAIT'S PAPER.

DR. PERCY BROWN, BOSTON: Every man will agree with me that such surgical support as this is the highest stimulation to roentgenologic progress. What we have already accomplished with reference to malpositions of the colon, merely is suggestive of what we may expect to do in the future and what additional information we are going to give the surgeon and the orthopedist. What else can we tell him that will help him in his work. What else is there remaining of information which we hope to get by experience. Mere suggestions as to the future are made by two or three observations of physiologic conditions which may prove inevitable.

As to the question of gastric peristalsis. I think that gastric peristalsis serves both as a cause and as an effect. One of the stock forms of information which we should give to the surgeon is information as to the peristaltic waves. We have not been able to do that until lately. We have not had it in our power to observe peristaltic waves sufficiently well before this. However, these waves exist and can be determined.

In the case of the little child whose case Dr. Goldthwait reported, it was only with great difficulty that we could get the child to take the bismuth which its stomach could hold and should hold in order to show peristalsis properly and plainly. Now, as to the question of intensity. Inasmuch as food goes to the ileocecal valve we have a field of the greatest interest to us as well as to the surgeon. At the ileocecal valve itself a new vista is opening up, one which appeals to the orthopedist and to the general surgeon; that is, abnormalities with respect to the passage of food just past the point where the appendix usually is or was. Why? Because many of these appendices are not seen until very much later than they should have been seen. Maybe they have been secreted with and without operation, and adhesions have formed. Right in that immediate region you get a distinct field of abnormality which causes a great deal of trouble. Of course, many of these patients do not come primarily to the orthopedist.

I remember a patient who came to me from one of our general men. She could place her finger right over the painful area

where she had had her appendix removed. Following, perhaps, the method of Dr. Crane, I placed a little piece of tinfoil right over the spot, and the kink was not 5 cm. from the painful point. That points the way for us.

Another interesting situation is just beyond, behind the turn of the colon at the liver, where, as Dr. Goldthwait showed you, the gut suddenly becomes small and the food trickles along.

Hertz, of England, wrote an admirable book on constipation. He calls that condition there one of hyperperistalsis, where apparently the succus entericus is stimulated and everything is ready for the food but none comes. Therefore from that spot on to the splenic flexure there is what Hertz calls a greedy gut, a contraction of the circular muscle fibers. When the food finally does reach this gut it is dry and hard and the contractions of the gut segment the food and it becomes shapeless.

As our technic improves we will observe more in regard to the duodenum, its anatomy, functions and pathology. There is nothing in the outlook for us which is really of more importance than this. Of course, every general practitioner will bring up the relative difference between the abnormal and the normal. It is difficult to say what is normal and what is abnormal. What would be quite normal for one would be distinctly abnormal for some one else. What we are looking for is a palpable cause, something that can be seen. A person presenting symptoms has something abnormal, and we must find out what is wrong with him, but to be convincing the evidence must be visible.

With reference to the little child Dr. Goldthwait showed you, no practitioner could receive a patient of that type without wishing that he could give help. The poor little thing was suffering from Still's disease. She was all tied up in a knot, dragging herself along with no vitality. Such cases are the stimulus to do something, and it is the province of the roentgenologist to render the necessary assistance.

DR. GEO. E. PFAHLER, PHILADELPHIA: I wish that the whole profession of the country might have heard this paper, and I hope that Dr. Goldthwait will continue his work because there is so much in it and there is so much more that he could tell if he had the time.

I would like to call attention to the work of Jordan, published recently, in which he spoke of the kink in the duodenum at its

junction with the jejunum which causes a spasmodic condition of the former leading to pain, symptoms of ulcer and sometimes of adhesions. I mention this because it can so easily be overlooked in a single examination. The condition may be present at one moment and not at another. To determine that it is present we must make a series of examinations or do considerable fluoroscopic work.

I have been very much interested in this apparent obstruction or reduction in size of the colon. I have seen all that has been demonstrated and more in my work, as most of you have, but I am confronted by this problem.

The doctor presents his patient. The patient details her symptoms, I point out these things and then the doctor asks me what will he do. I wish that Dr. Goldthwait would tell us what he thinks causes the retention of the feces just beyond the hepatic flexure and just the other side of the median line, the most frequent location, and what he considers the proper treatment for these conditions. If we can point the way for the general practitioner and set him thinking, we will have accomplished a great deal.

In the past week I examined two patients,—one who has had pain in the right side of the abdomen. I found evidences of adhesions between the descending and transverse colon and the sigmoid. One patient had been operated on for appendicitis, the other not, but in both patients the conditions present were the same.

There is a very definite reason for the existence of these conditions and there must also be a definite line of treatment, but when we come to these congenital obstructions, or even the acquired obstruction to the passage of the waste through the colon, it is a great problem to decide just what we are to do. Therefore, anything that Dr. Goldthwait can tell us as to the treatment will help us in our future work.

DR. ARTHUR HOLDING, ALBANY, N. Y.: I would like to ask Dr. Goldthwait one question in regard to these cases. They present themselves to us with some pathologic condition. We examine them and find these abnormalities, and then it is sometimes a question as to the relation of these two conditions to each

other. We have found more pathology. I would like to know whether the correction of these abnormalities is successful, that is successful in a therapeutic sense. Perhaps, we will find more pathology in these cases as the condition gets worse.

DR. CHAS. L. LEONARD, PHILADELPHIA: In these cases of obscure abdominal lesions where we know that there is some pathology present which is causing the disturbance and which cannot be discovered by the ordinary means, I make stereograms. In one case there was considerable pain at the iliosecal valve. The plate showed a stricture of the ileum. There were no peris-lead pencil. There was no history of appendical trouble, and the pencil. There was no history of appendical trouble, and the condition was thought to be of syphilitic origin. It is one of those cases referred to by Dr. Brown in which there is a lesion of the small intestine discoverable by the Roentgen ray, and now we are anxious to know what we can do for these patients.

DR. F. H. BAETJER, BALTIMORE: I have been fortunate to see many of these cases not only from the standpoint of the general surgeon and orthopedist but from the standpoint of the gastro-enterologist, and I have found, as was stated by Dr. Goldthwait that we must examine these patients repeatedly.

I have in mind one patient whom I saw for a period of 179 hours, taking pictures at frequent intervals, trying to get rid of the bismuth in the cecum. I finally gave a drastic purgative.

In these pictures we see varying degrees of prolapse of the ascending colon in all the cases. In my cases there were only two where there was any change in the position of the splenic flexure. In both these cases all the abdominal viscera were in the pelvis; in no case did we get a bit of bismuth above the brim of the pelvis. I have not seen any case where there was a partial prolapse of the descending colon or splenic flexure. Does Dr. Goldthwait get these cases of partial prolapse, and when he finds the splenic flexure is it completely down or not?

DR. CLARENCE E. COON, SYRACUSE, N. Y.: We must be expert diagnosticians not only in the interpretation of the roentgenogram, but we should examine the patient by every known means.

We have patients referred to us for examination by the attending physician for examination of the stomach. Nothing else is wanted. These cases almost invariably represent the late types protrayed by Dr. Goldthwait, and I believe that it is our duty to follow the bismuth meal from the time it is ingested to the time it is expelled. In demonstrating these ptoses we have a duty to perform, that of educating the general practitioner, and he is slow to expect these things.

If we can show that there is absorption of toxins in these cases where feces are retained, it does not seem that any sane man could doubt the fact that it may produce a variety and multiplicity of lesions any one of which may be responsible for symptoms presented. These are chronic sufferers and we must give them relief from their trouble. I have found it difficult to convince doctors that in a great number of cases the colon is at fault when the patient was referred to me for an examination of the stomach. In one or two cases I was able to observe the patient for a week and the colon was still almost completely filled with bismuth. Almost invariably it had gone as far as the splenic flexure. Then followed free catharsis and free movement of the bowel. No one could fail to be convinced that there must be something wrong there, and yet we must educate the profession to the reasonableness of what we find and insist that they adopt measures which will give these patients relief.

DR. P. M. HICKEY, DETROIT: Some years ago I read Dr. Goldthwait's contribution to what he called rheumatism, and since then I no longer speak of rheumatism. Yet in presenting the plates of the child, he said that the child had rheumatism. I would like to inquire of Dr. Goldthwait what type of rheumatism that child had, and whether the arthritis present was directly due to the condition of the colon.

DR. KENNON DUNHAM, CINCINNATI: Dr. Brown referred to the fact that the practitioner is always calling for what is normal. It is not only the general practitioner who is calling for the normal but even the scientist wants to get as close to the normal as possible. Therefore, the normal anatomy of the

colon and of the stomach is something that must be defined thoroughly before we can go to any great length with this work.

In looking over Dr. Goldthwait's plates much was said about the hepatic flexure being so low down, and also that six or seven or eight hours after ingestion the bismuth had travelled only a short distance. I have made pictures of fifty stomachs and colons of people who are apparently normal and the same conditions were present to a certain extent as we saw in Dr. Goldthwait's plates. None of my subjects retained the bismuth in the stomach over seven hours, and in none was the hepatic flexure very high. I do not know just how high up this flexure should be, and I would like to know. It is uncommon in my experience to see the bismuth hurry from the hepatic to the splenic flexure.

The work of Cannon and Holzknecht has been very interesting, and I would like to hear from Dr. Goldthwait what he considers normal. The function of the colon does not seem to be to get rid of waste. I believe that in the first part of the colon there is a function that is far beyond that of merely getting rid of waste. The fat stays longest in the first part of the colon. It is mixed with the digestive juices in the small bowel and then it remains for a long time in the first part of the colon. So that there must be some physiologic function there. It is at the sigmoid flexure that we have the pocket for getting rid of the waste.

DR. W. H. EAGAR, HALIFAX, N. S.: I read Hertz's book on constipation and became very much interested in it. I think that he cited a sufficient number of cases to show that we can depend on the arrival of the bismuth meal in certain parts of the colon at certain specified times. He has done enough work on the normal subject to show that there is a definite time for the arrival of the bismuth.

It is a great credit to Dr. Goldthwait and the orthopedists in general that they have taken up this work. They are the ones who are advancing this subject in this country. We know well that in a number of cases constipation for twenty-four hours produces symptoms of what is ordinarily called a bilious attack. There is an acute infection following some stasis in the colon. In Dr. Goldthwait's work we are probably dealing with some intoxication from the colon which is producing the joint troubles. This is not, however, shown in a particularly acute form.

Where does this intoxication come from and where is it particularly located in the colon? That is what the roentgenologist must determine. Why is it that in cases where there is this delay in the passage of the waste just beyond the splenic flexure that there ensues such profound constipation? This does not last for a day or for a month but for many months. Why do not these patients show definite symptoms of intoxication. I have been very much interested in this subject and we owe Dr. Goldthwait a debt of gratitude for showing what he has accomplished in this line. It ought to stimulate us to further research.

DR. ROLAND HAMMOND, PROVIDENCE, R. I.: I am familiar with much of Dr. Goldthwait's work, and I want to add my tribute to the valuable work he is doing. I want particularly to emphasize the value of the treatment in these cases. I have observed many times that although we may not change the position of the viscera by our supportive and stimulative treatment we have at least given the patient relief from his symptoms. We may not have pushed up the stomach, but we have taken off the strain , the sag, and that is what the patient needed. By restoring the normal physiology by supportive apparatus and stimulating exercises, getting the musculature back to normal, we have accomplished what we intended to do.

I hope you will not lose sight of the fact that many members of this society were among the first to demonstrate this ptosis of the viscera, but it took the genius of Dr. Goldthwait to demonstrate the association between these joint lesions and this ptosis.

DR. JOEL E. GOLDTHWAIT, CLOSING THE DISCUSSION: It was not I who first called attention to the colon as the source of infection in these cases. Other men have pointed out the existence of this condition; for instance, Metchnikoff and Lane. I got a part of the suggestion which led me to take up this work from the members of this society. First of all, I wish to apologize for using the word rheumatism. The child in that case had Still's disease, or, as we term it, chronic infectious arthritis. It was being poisoned, although the primary infection did not come

from the intestine. That is what I want you to try to do when you study these cases,—use your common sense and don't say that it is the colon or the stomach. The patient is a human being with a lot of organs, whose balance and interrelation must be worked out.

I agree with Dr. Coon that it is the function of this society to educate the doctors in regard to this work. I am perfectly willing to help along the good cause.

In regard to the child. It had a condition which a few years ago I would have regarded as a tonsillar condition. Most of the cases of Still's disease are cases in which we find enlarged glands, with a stiff spine, so that the diagnosis can be made quite readily. However, chronic infectious arthritis is a far better term to use than Still's disease. That child had large boggy tonsils, and it had a chronic joint trouble. My work is in chronic medicine. Most of my patients represent the failures of my profession. I believe that there is a way out for all of them. They are human problems capable of solution by human intelligence, otherwise the scheme of the universe is wrong,—and it is not wrong.

There was something causing the joint symptoms but they were not causing all the trouble. If we had paid attention to that only, we would have been treating the patient from now until doomsday. The patient was sent to many different men, a throat man, an internist, and finally to Dr. Brown. My report to the parents was that I thought the child could be cured. I did not mean that the child would get normal ligaments on the colon, which I explained to the parents perfectly, and that was only one of a lot of things wrong, but I believed that we could put that child in a condition where the functions of the body would be performed normally; they would represent health. The first thing to do was to attack the tonsils.

A number of years ago we would have contented ourselves with only that, and then we would have wondered why the patient did not get well. That child had bad tonsils, and I believe that the primary infection in that case came from the tonsils, but there was something besides the tonsil. If there is a deranged stomach, there is a coated tongue; the whole pharyngeal wall is in the same condition, which we are apt to forget. That means that the crypts of the tonsils, which are small anyway, are closed, and the result is the infection. Many times a tonsil inflammation acts that way, and while the tonsil may be the place where the conditions become chronic, there is some-

thing wrong elsewhere, and that puts the child in a condition susceptible for an infection of any kind. A lot of other things come in the same way. It is our duty to ascertain all the trouble and say that it is only the tonsil or the colon.

I told the parents to have the tonsils removed, and that the child would probably be better for a few days but not to be disappointed if the child got worse again shortly afterward. The immediate improvement after the operation is not the critical thing, because that is only temporary. The child passed through the operation, was better for a few days, then gradually got worse as she began to take food. Then we began to give foods which made bulky stools and stretch the colon, obliterating the pockets and unloading the bowel. We are making that child do a lot of things to control the obstruction and infection.

With the organs out of place the duodenum may be pressed on and if the child has a loaded stomach it shuts off the duodenum and in the congenital ptoses you ought to know before the patient is operated on that there will be a gastromesenteric ileus unless you pillow the patient up in bed or place him on his side so that the duodenum can empty itself. That is very important. If you constrict the abdomen or allow the patient to rest on the abdomen, you obstruct the pancreas, and perhaps, that is a cause of sugar in the urine. I have only a theory about that, but some men believe that mechanical interference with the function of the pancreas is the cause of glycosuria. That is only a theory, but I know that the pancreas can be disturbed, especially by customing.

Dr. Pfahler spoke of the location of the kinks. Of course, if you have everything dragging down, the place where you get kinks is where the peritoneum makes alignment to hold certain parts back. It does that at the first and second portion of the duodenum, low in the ileum, close to the cecum where Lane described his kink, and third, where the sigmoid ceases to be sigmoid and begins to be rectum. Here the peritoneum holds the bowel up and pressure downward makes a kink, and frequently an ulcer forms at that point. Ulcer of the stomach and duodenum may be associated with this condition, and we must see whether it has something to do with it.

As to sewing organs in place, if done intelligently, it is all right, but if we sew up the stomach only, it will go down again to where it was in a few months. If you sew the kidney only, it, too, will return shortly to its normal position, as soon as the

new ligaments are stretched. If there is a special reason which makes suture desirable, all right; but it must be followed up by other treatment. The same is true of operations done to drain the bowel. The short-circuiting of the bowel which Lane is doing so much is faulty in that Lane sees chiefly the colon and not the other viscera, and while he gets some good results, they are not what they might be if he saw all the pathology in the case.

It is not only the colon which is causing the mischief. For instance, one reason why bacteria multiply in these cases is that there is not the normal amount of intestinal antiseptics, such as bile and pancreatic fluid. The bacteria may ascend into the duodenum, where they should not be. It is a complex subject, and we must hold to the idea that we are dealing with a human being made up of a lot of parts, and approach the case as one that is curable, capable of solution, and get rid of all ideas which our fathers put up to us that it cannot be cured because it has not been cured. Give up all terms which mean nothing, and you will get better results.

As to the prolapse. I have seen the same thing on the left side as I showed you on the right,—a free descending colon with a rigid ascending colon. Sometimes this occurs on one side and sometimes on the other.

As to results. We must use common sense. You cannot make normal individuals out of these patients, but unless there is some hope for them, medicine is pretty discouraging. These people will propogate, and their progeny will have these things; then we will have a weaker instead of a stronger race. There, again, Nature's laws come in. In breeding animals you can breed out one species and breed another in. So here. If we can prevent the acquired thing from forming, there will be a much lessened congenital trait. You cannot prevent the congenital condition, but you can treat the acquired cases and thus lessen the number of congenital cases.

My youngest boy has a congenital visceral ptosis. He is nine years old. He is never sick, but he has never been robust and well nourished. He was always having trouble; losing his appetite, followed by a ravenous appetite, clay-colored stools. After awhile we approached the problem from the common sense point of view, doing the things which really helped him, such as wearing a pad over the lower abdomen. Then he lies down with a pillow under his back, or humped up as he terms it. It tightens

the cervical fascia, the supporting ligaments of the diaphragm; it flares the ribs; tightens the abdominal wall; pulls up his stomach and colon. When he is digesting his food for half an hour after his noon meal, he lies that way. Then he turns over on his face over the end of the bed so that his thighs are separated, and hangs head down for five minutes, long enough for his muscles to relax. He sags down and lets everything fall down. He has been doing that for a year and a half, and since then he has had only one bad bilious attack, the result of going without his support, and he had filled himself up. The attack was cut short at once by simply standing him on his head. As soon as he leaves off his belt he has trouble.

I feel now that I can approach my patients and say that this or that is the source of the difficulty, and if we can only get it straight so that the organs work right, they will get well. You cannot always do it, but many times you can. The great difficulty is to get the physician and surgeon to look at these cases broadly. They see only a stomach or a colon or something else; that is not enough. It is only a part of the disturbed organism. You must nourish these patients; correct their posture, until the retroperitoneal, a sub-cutaneous fat tissue present, shows that the fat metabolism goes on as it should normally.

This is a tremendously big problem, and it is largely the work that you can do that will make the medical profession see these things as they are. We, who are working in chronic medicine appreciate this more than anyone else.

PRELIMINARY ANNOUNCEMENT OF ANNUAL MEETING.

The next annual meeting of the American Roentgen Ray Society will be held at Niagara Falls, N. Y., during the 11th, 12th, 13th and 14th of September, and the headquarters will be the International Hotel. It is the earnest wish of the Officers and the Executive Committee of the Society to make this meeting as great a success as any yet held, and to surpass all previous ones if possible. Those in charge will make every effort to attain this end, but just as much will depend upon the individual efforts of each member of the Society. It is hoped, therefore, that every member will do his or her part by at least attending the meeting.

The program is by no means full as yet, and anyone who contemplates presenting a paper is requested to send the title and a short abstract to the Chairman of the Executive Committee, Dr. Preston M. Hickey, 32 Adams Avenue, Detroit, Mich., as soon as possible.

It is our desire to have the exhibition of radiographs—both negatives and prints—an essential feature of the meeting. Every member will receive a request from the Exhibit Committee before long, but in the meantime begin to collect any plates or have any prints made which you wish to exhibit. Please begin this work now, and do not put it off until the last moment.

Another important feature will be a lantern slide demonstration. Each member who wishes to show slides will be allowed five minutes for his demonstration. Please do not put off getting your slides ready, but begin now.

It has seemed wise to follow the plan instituted last year of continuing the sessions through four days. There are many advantages to be derived from the addition of the extra day. All of us realize that the attempt to hurry through the usual program without any time for relaxation is tiresome, both physically and mentally, and that the mind is far better able to grasp and retain new ideas and important facts when refreshed by occasional periods of relaxation for body and mind. Then, too,

the extra day allows more time for discussions, which are often as valuable, or even more so, than the papers discussed. Furthermore, a few spare hours between sessions offer numerous opportunities for informal talks and discussions among small groups of members, and many of the most valuable ideas acquired originate from such informal discussions of the personal experiences and views of our friends.

It was decided at the Richmond meeting to hold no evening sessions this year, partly with the above idea in view, and also to give better opportunities for the study of the radiographic exhibits and inspection of the manufacturers' exhibits. Moreover, the social aspect of our meetings should never be disregarded. Although our Society is a scientific body, it is unique in many ways. We have been especially unfortunate in the loss of a large number of our members who have been martyrs to their profession and specialty, and this has created and should always maintain a strong bond of fellowship among us, and as many of us meet but this one time each year, the social side of our meetings is indispensable in the attainment of this end.

There is much of interest to be seen at Niagara Falls, and in order that all may have the opportunity of sight-seeing without interfering with the attendance of the sessions, it has been decided to devote one afternoon to one or more of the numerous excursions about the vicinity.

LEONARD RUE,
Chairman Local Com.,
841 Smith Street, Buffffalo, N. Y.

DR. CLARENCE E. COON,
Chairman Plate Exhibit,
Syracuse, N. Y.

F. H. BAETJER,
President.

H. K. PANCOAST,
Secretary.

P. M. HICKEY,
Chairman Executive
Committee.

THE NEW ILFORD X-RAY PLATES appear to satisfy the requirements of the most exacting radiographer. The following is the report of an X-Ray specialist who was asked to give us an opinion of the comparative value of the new plates.

"I have tested these plates on every class of subject, from the simplest to the most difficult, and have not the least hesitation in saying they are quite the best I have used."

—ARCHIVES OF THE ROENTGEN RAY

The Ilford
X-RAY PLATE

E. B. Meyrowitz
INCORPORATED

General Distributing Agents for America

104 E. 23rd Street .·. NEW YORK

AGENTS CARRYING STOCK AT

Chicago, Ill.	*Atlanta, Ga.*	*Clevelend, O.*
Washington, D. C.	*St. Paul, Minn.*	*Pittsburg, Pa.*
Pbiladelphia, Pa.	*Los Angeles, Cal.*	*Buffalo, N. Y.*

Please Send for Particulars, Prices and Addresses of Agents

Fig. 1.—Shows lateral view of a skull in a cadaver, with the right sphenoidal sinus injected with bismuth paste. Notice that the left sphenoidal is larger than the right and projects beyond it posteriorly.